

RELATIONSHIPS AMONG SELF-ESTEEM, PSYCHOLOGICAL TYPE,
AND WEIGHT HISTORY AS A BASIS FOR INDIVIDUALIZING
INSTRUCTION IN SUCCESSFUL WEIGHT REDUCTION AND MAINTENANCE

BY

LAURA KREIS GUYER

A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL OF THE
UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

1987

Copyright 1987

by

Laura Kreis Guyer

ACKNOWLEDGEMENTS

This research was inspired and encouraged by many people. Without their participation, completion of this project would have been impossible. I would like to express my deepest thanks to the following individuals who assisted me: Dr. Gordon Lawrence, chairman, who was always ready with a word of encouragement and whose enthusiasm for this project helped me to focus on my goal; Dr. Forrest Parkay, member of the committee, who was always positive, encouraging, and constructive with advice about style; Dr. Robert Jester, member of the committee, who offered statistical expertise and advise about methodology with patience and humor; Dr. Peggy Borum, member of the committee, whose insights and suggestions helped me to tie together the areas of human nutrition and education; Mrs. Jamey DeLong at the Center for Application of Psychological Type (CAPT) for encouragement with this project and assistance with securing materials and information needed; Mr. Jerry MacDaid at CAPT for statistical assistance with results from the Myers-Briggs Type Indicator; Ms. Leila Cantara for expert assistance with the final typing of this dissertation; the many individuals who agreed to participate in this research; friends who took the time to encourage me and ask about the progress of my study, especially those who took the time to pray for me when my schedule was tight; Donald and Patricia Kreis, my

parents, who instilled in me a love of learning; Susan and Michael Hoffmann, my sister and brother-in-law, who encouraged and supported me; Benjamin and Matthew Guyer, my sons, who slept and played on schedule and who showed me that photocopying could be an adventure; Robert Guyer, my husband, who supported me from the beginning and who never let me quit, and without whose love and support this project would have never been undertaken or completed; and Jesus Christ, my Lord, who has taught me with patience that I am unique and special. This realization has been the inspiration for this study and His grace has made it all possible.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
ABSTRACT	vi
CHAPTERS	
I INTRODUCTION	1
Background of the Problem	2
Statement of the Problem	6
Significance of the Study	6
Assumptions	10
Definitions	10
Organization of the Study	12
II REVIEW OF THE LITERATURE	13
Individualized Instruction and Dietitians as Educators	15
Ideal Body Weight	21
Predictor Variables	23
Environmental/Demographic Predictors	24
Behavioral Predictors	27
Psychological/Cognitive Predictors	35
Internal Versus External Regulation of Intake	37
Locus of Control	49
Set Point and Restraint Theories	55
Self-esteem	75
Psychological Type	80
Theoretical Framework for Hypothesis Development	86
Summary of Related Research and Implications for This Study	89
III PROCEDURES AND METHODS OF ANALYSIS	91
Site and Sample	91
Instrumentation	91
Design and Analysis	93
Data Collection	94
Hypotheses	95

IV	RESULTS	97
	Sample Demographics: Summary of Results	97
	Hypotheses One and Two	103
	Hypotheses Three	108
	Hypothesis Four	108
	Hypothesis Five	108
	Hypothesis Six	110
V	SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	112
	Summary and Conclusions	112
	Recommendations	116
APPENDICES		
A	PERSONAL WEIGHT HISTORY QUESTIONNAIRE	123
B	LETTER TO PARTICIPANTS	125
C	PROCEDURES FOR COMPLETING THE SURVEY INSTRUMENTS	127
	REFERENCES	128
	BIOGRAPHICAL SKETCH	137

Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Doctor of Philosophy

RELATIONSHIPS AMONG SELF-ESTEEM, PSYCHOLOGICAL TYPE,
AND WEIGHT HISTORY AS A BASIS FOR INDIVIDUALIZING
INSTRUCTION IN SUCCESSFUL WEIGHT REDUCTION AND MAINTENANCE

By

Laura Kreis Guyer

December, 1987

Chairman: Gordon D. Lawrence

Major Department: Educational Leadership

Developing weight loss programs that result in both weight loss and successful weight maintenance has been difficult. Most individuals who enter weight reduction programs lose weight, but statistics indicate that only 5-15% of those who lose weight will maintain that loss for one year.

Since no single cure for obesity has been found, it has been proposed that a multidimensional and individualized treatment program is the best solution. Since the needs, backgrounds, and experiences of those in weight reduction programs vary, the identification of individual differences by a pretreatment assessment would indicate areas of needed instruction and remediation.

The purpose of this study was to examine weight history and the psychological constructs of self-esteem and psychological type as behavioral predictors of successful weight maintenance. Sixty-eight obese and previously obese adult volunteers participated in this study. The group was divided into 13 maintainers, 35 participants, and 20 nonparticipants. Maintainers were those who had been obese previously but who had lost weight to their ideal range and had maintained that

weight for a minimum of one year. Participants were obese individuals trying to lose weight. Nonparticipants were obese subjects not pursuing weight reduction. Self-esteem was estimated with the Coopersmith Self-Esteem Inventory (SEI). Psychological type was identified with the Myers-Briggs Type Indicator (MBTI), and weight history information was gathered with a personal weight history questionnaire.

Six hypotheses were tested using a variety of statistical methods. It was expected that group membership would show differences for the parameters that were tested.

Results indicated that the obese and previously obese were a heterogeneous group with respect to psychological type but that significantly ($p < .05$) more Introverted-Sensing-Feeling-Judging (ISFJ) types were represented than would be expected in the general population. Measurements of self-esteem showed nonsignificant differences among the groups. The maintainer group showed the strongest relationship between extraversion and self-esteem followed by the participant and nonparticipant groups. Finally, weekly exercise frequency, parental weight history, amount of social support, self-esteem score, and Extraversion score were all found to contribute to prediction of group membership.

Thus, it was found that weight history variables and psychological constructs may contribute to successful weight maintenance. For health educators, the awareness of individual differences among the obese allows program individualization to meet specific educational needs so that problem areas may be targeted for remediation and change.

CHAPTER I INTRODUCTION

Developing weight loss instruction that results in both weight loss and maintenance has been difficult. Most individuals who enter programs for weight loss are able to lose weight and many are able to reach their desired weight. However, Brody (1982) cited statistics that show 80% of those who lose weight regain their loss within one year. Therefore, one cannot assume that successful weight loss results in successful weight maintenance.

Presently, those entering weight control programs are screened primarily by weight status. Program participants then proceed through structured programs with planned learning activities. The only individualization that occurs is in counseling sessions with the therapist and, surprisingly, not all programs include this component.

To develop a successful weight management program, one must begin by identifying those factors related to weight loss and weight maintenance. This information may then be applied to the individual needs of each client. Unfortunately, to date few predictor variables have been isolated with positive correlations to successful weight management.

Historically, researchers studying obesity have focused on the identification of physiological and psychological variables related to predicting successful weight loss. However, most of those studied have not demonstrated clinical usefulness. These results have led some researchers to propose that there is no single cure for obesity and that a multidimensional and individualized treatment plan is the best solution. Rozensky and Bellack (1976) concluded that weight loss resulted from an interaction between personal characteristics and treatment design. They wrote that response to treatment should be viewed in conjunction with preexisting personal differences.

Since those who enroll in weight control programs have diverse backgrounds, needs, and experiences, there is a need to individualize program formats according to many variables. To do this, it is important to identify individual differences and variables that will promote successful weight control in the obese population.

Background of the Problem

Most research on obesity has been focused on the identification of variables related to weight reduction but few studies have provided follow-up data about variables enabling previously obese individuals to maintain their weight losses. Miller and Sims (1981) wrote that "long-term follow-up evaluations of either dietary, medical, or behavior modification treatments are rare" (p. 57). In fact, they proposed that variables facilitating weight loss may differ from those

resulting in weight maintenance; for example, attention to eating style using behavior modification techniques results in consistent weight loss. However, continued behavioral modification of eating style does not result in successful weight maintenance (Cooke & Meyers, 1980).

Cooke and Meyers (1980) noted that there were three problems with current treatment methods. First, on the average, individual weight losses were small. Second, large intersubject variability for weight loss existed. Third, program termination resulted in poor weight loss maintenance. They concluded:

the weight loss literature reveals wide differences among subjects with respect to responsivity to treatment. . . . The lack of attention to individual differences among obese subjects may account for the great variability in response to treatment. . . . It is hypothesized that maximum treatment efficacy can be brought about by individualizing treatment programs on the basis of pretreatment assessment. (pp. 60-61)

Weiss (1977) noted that research designs were inadequate to produce meaningful data.

It is time that investigators began to systematically explore the possibility of interactions between predictor variables and treatment modality. Often the search for predictor variables has been an afterthought, secondary to other issues involved in a research study. This has often meant the use of correlation procedures, applied across treatment groups. It is time that investigators concentrated on the predictor variables as the primary goal, utilizing few treatment groups . . . and studied both subjects high vs low on a variable, and correlations within each treatment group. The primary issue . . . is not who will lose weight, but who will lose weight in what type of treatment. With such knowledge clients can be directed into the most appropriate treatment program for them, or remedial efforts can be made prior to placement. (p. 199)

Cooke and Meyers (1980) supported the idea of an assessment of characteristics prior to treatment. They wrote that subject characteristics were important in "designing an individualized treatment program" (p. 67). Both Cooke and Meyers (1980) and Weiss (1977) agreed that program individualization would maximize resources and treatment effectiveness.

Many of the obesity researchers have produced data that are unreliable because of poorly designed studies. Generally, there has been a failure to identify and systematically build on a valid and reliable body of knowledge related to successful weight control.

As obesity continues to be a societal problem, it is important to examine differences between those who have maintained their weight loss and those who have not. Instruction in weight control can then be individualized according to participant differences.

Two constructs not widely studied that may be useful as indicators of successful weight loss behaviors are psychological type and self-esteem. Few studies have been conducted to evaluate their relationship to weight control.

Researchers suggest that student learning is improved when psychological type theory is applied to the learning environment. Myers and McCaulley (1985) described the theory of psychological type as proposed by C. G. Jung (1921/1971) which postulates systematic differences among individuals with regard to perception of their

environment and the resulting conclusions. Psychological type theorists predict that individuals will show systematic differences corresponding to "reactions, values, motivations, skills, and interests" (Myers & McCaulley, 1985, p. 1). Permanent weight control also includes the elements of interest, values, motivation, and skills. As components of the psychological type model, these have been shown to be affected by type differences. Because researchers have shown a relationship between one's type and learning style, application of type theory to weight control may enhance learning for obese subjects.

The construct of self-esteem has been regarded as an important personality component but few researchers have directly studied the effect of self-esteem on weight management. Coopersmith (1986) identified a judgmental process of self-esteem that related personal performance to conclusions drawn about personal worthiness. He wrote that these conclusions about self could be either conscious or unconscious, but concluded that regardless of the state of consciousness, these self-opinions found expression in "voice, posture, gestures, and performance" (p. 5). In the context of self-esteem theory, it was hypothesized in this study that performance, as measured by weight maintenance, would be related to an individual's conclusions about self-esteem.

Statement of the Problem

The problem of this study was to identify the relationships and interactions of psychological type, self-esteem, and personal history variables in obese and previously obese individuals. The Myers-Briggs Type Indicator (MBTI) was used to identify psychological type. Self-esteem was measured by the Coopersmith Self-Esteem Inventory (SEI). Personal history variables were measured with the Personal Weight History Questionnaire developed by the researcher.

This research was conducted to answer the following questions:

1. To what extent do psychological type differences, as measured by the MBTI, suggest an ability to successfully maintain a weight loss?
2. To what extent does a relationship exist between self-esteem and maintenance of ideal weight?
3. Do differences exist between obese and previously obese subjects for psychological type and self-esteem?
4. Does a relationship exist among psychological type, self-esteem, and weight history variables that would enable prediction of those individuals most likely to maintain a weight loss?

Significance of the Study

It is estimated that 10-15% of children and 30% of adults in America are obese. If all Americans were at ideal weight there would be one-third fewer people with congestive heart failure and brain infarctions and one-fourth fewer people with heart disease (Brownell, 1980).

Vasseli, Cleary, and VanItallie (1984) cited statistics pointing to an increase in obesity for some age categories. From 1960-1962 to 1971-1974, estimated percentages of obese men aged 25-44 years increased from 14.1% to 15.3%. Estimates for women during the same period increased from 19.0% to 20.7%.

Despite the interest in weight reduction and the medical knowledge available concerning the adverse effects of overweight on health, to date no permanent treatment for obesity has been found. Annually, Americans spend billions of dollars in attempts to lose weight and many medically safe and unsafe methods of weight control have been marketed. However, of those who lose weight, most will regain it within one year (Brody, 1982). These facts have made weight reduction a thriving business and topic of interest for researchers, educators, consumers, and entrepreneurs.

The statistics reflect a need to find a solution to the societal problem of obesity. Many have profited from the "yo-yo" effect of cycling weight loss and gain among the obese. Why has no effective solution been found by health professionals to treat this problem?

To begin with, the weight control literature is confusing and research results have been conflicting. Weiss (1977) wrote that locating variables to predict weight control would maximize resources by identifying those who would lose weight and under what conditions, but he stressed the need for studying variables with sound

psychological constructs and theoretical relationships to weight control. He criticized the current literature for the lack of similarity in populations studied, treatments rendered, and dependent variables measured. To date, research results have not explained the great intersubject variability seen with treatment.

There are two reasons why this study is significant. First, a summary of the literature on variables related to successful weight control and identification of those variables that are positively correlated was completed. These variables became the basis for the Personal Weight History Questionnaire used in this study. The second reason this study is significant is that information about the influence of self-esteem and psychological type on successful weight control is added to the existing literature on obesity. Results from this study should assist researchers in the forming of hypotheses to be tested in experimental research concerned with predicting weight maintenance from interactions of treatments and clients' personality variables.

Self-esteem researchers have suggested that differences between personal performance and personal aspirations may be reconciled based on the development of positive self-esteem. Achievement increases with more positive self-esteem.

Presumably, a belief in one's perceptions and the conviction that one can force or impose order on a segment of the universe is a basic prerequisite for significant creativity . . . the person with high self-esteem apparently moves more directly and realistically toward his or her personal goals. (Coopersmith, 1986, p. 4)

Ryckman and Cannon (1975) found that those with high self-esteem believed they had more personal control over the environment. These individuals believed they were free from control by others and that they had more control over events.

It is expected that these attitudes contribute to successful weight management, but few studies have measured the influence of self-esteem on weight control. A search of the literature yielded four studies that measured relationships between self-esteem and weight status. Mendelson and White (1982) found a significant relationship between body-esteem and self-esteem. Jacobs and Wagner (1984) found that the obese reported a lower physical self-concept than others. Pearlson, Flournoy, Simonson, and Slavney (1981) found no relationship between body image and weight loss success. Owusu-Bempah and Howitt (1983) found that cognitive awareness of body image was related to successful weight loss. Since achievement is related to self-esteem, it is believed that self-esteem may be an important component of weight management. Examined in this study was the relationship between self-esteem, as measured by the SEI, and weight control.

A search of the research literature yielded two studies of psychological type and obesity. Harris (1985) found that psychological type could not be used to predict obesity. His findings supported Cooke and Meyers's (1980) conclusion that the obese were not

a homogeneous group. Hildebrandt (1982) found that strength of Thinking-Feeling preferences on the MBTI was associated with weight loss ability. The present study included an investigation of the relationship between psychological type and successful weight maintenance. Also examined was the interaction among self-esteem, psychological type, and weight control.

Assumptions

Assumptions made for this study included the following:

1. Dieting and weight history information can be accurately recalled by each participant.
2. Each participant will respond to the MBTI and SEI honestly.
3. Participant self-perception is as accurate as the self-perception of those on whom the instruments were developed.
4. The global constructs of self-esteem and psychological type are not altered when applied to the specific area of weight control.
5. Involvement of the study's subjects with past or present weight control programs has not affected their outcomes on the three instruments used in this study, except as reported on the Personal Weight History Questionnaire.

Definitions

Weight status refers to current body weight.

Obesity is body weight exceeding by 20% the midpoint of the weight range for those of medium frame. The reference height and

weight chart is the 1983 Metropolitan Life Insurance Tables (Burton, Foster, Hirsch, & VanItallie, 1985).

Ideal weight is body weight within the parameters established by the 1983 Metropolitan Life Insurance Tables.

Maintainers were adults who had been previously obese, were currently at ideal weight, and had maintained this weight for a minimum of one year.

Program participants were obese adults involved in attempts to lose weight.

Nonparticipants were obese adults not attempting to lose weight.

Self-esteem is defined as "an attitude of approval or disapproval [that] indicates the extent to which a person believes him or herself capable, significant, successful, and worthy . . . a judgment of worthiness . . . expressed by the attitudes he or she holds toward the self" (Coopersmith, 1986, p. 5).

Psychological type refers to the 16 combinations of 4 preferences, each with specific characteristics postulated from the theory of C. G. Jung (1921/1971). The 4 preferences are Extraversion-Introversion, Sensing-Intuition, Thinking-Feeling, and Judgment-Perception. The theory is used to identify behavioral differences on the basis of type combinations.

Organization of the Study

Chapter I contains the statement of the research problem, background for the study, and information related to the significance of the study. A review and critique of the literature that are related to the study is found in Chapter II. In Chapter III is a description of the sampling procedures used to collect data and identification of the methods used to analyze the data. Results of the data analysis are in Chapter IV, and the summary of results, conclusions, and recommendations for further study are in Chapter V.

CHAPTER II REVIEW OF THE LITERATURE

The development of a successful program for permanent weight control has eluded researchers and medical professionals. Examination of the literature revealed many reasons why no "cure" for obesity has been found.

Many variables have been suggested as causal agents of obesity, yet few have demonstrated reliability in either predicting obesity or differentiating between lean and obese individuals. Many psychological theories have also been proposed to explain differences between obese and normal weight subjects. Unfortunately, clinical examination has failed to demonstrate construct validity for these theories. Another problem is that most researchers have not considered the possibility of interactions among variables or the notion that the etiology and treatment of obesity varies among individuals.

Two promising psychological constructs, self-esteem and psychological type, have demonstrated usefulness as behavioral predictors. Their application to obesity research and program development may provide a systematic approach to program individualization.

As health professionals become more aware of individual differences among the obese, specific problem areas may be more easily targeted for remediation and change. Programs may also be more readily adapted to meet specific educational needs.

This chapter begins with a review of the literature describing the rationale for individualizing instruction and motivational strategies. The role of dietitians as health educators in weight control programs is also described. Weight control programs commonly use dietitians as instructors since they are the health professionals educated about human nutrition and the interaction between diet and health. However, as educators, student dietitians do not receive adequate training in instructional methodologies. They generally have limited teaching skills and little awareness of the importance of adapting instruction to client learning style. The next part of this chapter is a review of the problem of weight control beginning with a definition of obesity and desirable weight. Next, obesity literature related to predictor variables and psychological theories is reviewed. To date, successful program development has not been possible because of construct weakness and lack of reliable information in these areas. Finally, the literature related to self-esteem and psychological type is reviewed for relationships to both learning style and weight control.

Individualized Instruction and Dietitians as Educators

Educational researchers have found that individual differences among learners include biological, cognitive, psychomotor, and affective variables. These differences interact with the learning environment to directly impact learning. Stronck (1980) noted that students have many differences, some, such as biological differences were readily apparent. Others, such as cognitive differences that include learning style, motivation, and preexisting knowledge prior to instruction, were less visible but also affected student learning.

According to Wang (1980), individualization of instruction allows students to maximize learning potential through a variety of instructional alternatives. Student assessment prior to and during the course of learning was used to identify appropriate alternatives that enhanced learning.

In addition to student learning style, another important consideration in individualizing instruction has been the teacher's cognitive style and style of teaching. Saracho and Spodek (1981) described cognitive style as perceptual style, personality, intelligence, and social behavior. They wrote, "these ways of functioning are not only distinctive, but they are highly consistent and stable" (p. 153).

Since cognitive style is related to both psychological and educational traits, it is a vital part of a person's personality.

Cognitive style has been found to affect both student learning and teacher instruction. Saracho (1980) found that a mismatch between the cognitive style of teachers and students resulted in significant differences in teacher expectations for students. When the cognitive styles of students and teachers were mismatched, Saracho found that teachers had more negative expectations for students with cognitive styles that differed from theirs. These findings were significant since Good and Brophy (1987) have documented the relationship that exists between teacher expectations and student performance.

Saracho and Spodek (1981) suggested that teachers should expand their teaching repertoires beyond their own cognitive styles. This would allow greater awareness of and responsiveness to student differences.

Fantini (1980) also addressed the need to recognize individual differences among students and teachers. He advocated a more synchronized match between student learning style and teacher teaching style.

Some have suggested that cognitive style does not greatly affect student learning. Bengston (1979) noted that cognitive style described "preferred and characteristic ways of perceiving, learning, and thinking" (p. 91). He concluded that the movement to allocate resources for assessment of individual cognitive style and design of a matching curriculum was premature. Bengston wrote that there existed

a variety of teaching strategies that may be used effectively in response to differing student learning styles.

For the traditional classroom setting, Bengston's point may be well made. Professional teachers are aware that individual differences exist among students. Using the suggestions of Saracho and Spodek (1981), they may be encouraged to expand their teaching repertoires.

Bengston's point becomes critical when one takes learning out of the traditional classroom setting and into the environment of, for example, a hospital-based weight control program. In this setting, teaching is the responsibility of a health professional, typically a dietitian, and most of the students are adults with a variety of experiences and expectations.

Clinical dietitians are the professionals who teach others about the relationship between food and health. Their major responsibility is to help individuals learn to modify lifestyles and incorporate new eating behaviors. But, to do this they must rely on skills that enable direct and persuasive communication with clients.

Client teaching most frequently occurs in nutritional counseling sessions where diet and related medical information are given and individualized according to client food habits, preferences, and lifestyles. The goal is to teach and motivate clients to change their current food habits and lifestyles according to food preferences.

Successful implementation of new dietary habits is frequently dependent on a successful interaction between dietitian and client.

Danish, Lang, Smicklas-Wright, and Laquatra (1986) noted that, despite the importance of developing effective skills, nutrition curricula often failed to adequately train student dietitians. Noting that the delivery of medical facts and nutrition information were the components of most teaching situations, they stressed that these alone did not constitute effective nutrition counseling. Rather, they claimed that counseling should be composed of the following two interrelated processes. First, a relationship should be developed with clients based on mutual trust, rapport, and empathy. The dietitian must know how to facilitate client's self-exploration to direct them toward change. Second, the dietitian should help clients develop realistic and specific guidelines for change and implementation of new behaviors.

Caggiula and Milas (1986) noted that clients approached nutrition counseling with "mind sets" about themselves and their environment. To help clients change priorities, dietitians needed skills from both nutrition and behavior therapy models. However, these skills were frequently not taught to student dietitians.

Hoeltzel (1986) explained that there were many counseling strategies available to help clients make lifestyle changes, among them were behavioral, reality, Gestalt, and nondirective therapies.

However, since the therapeutic method differs in each, dietitians need awareness of the respective strengths and weaknesses of each method. Counseling strategies work best when matched to particular situations and individuals but, as Hoeltzel noted, some dietitians prefer to adapt all situations to one counseling strategy. Failure to individualize the counseling setting based on client "mind set," strengths, and weaknesses may give insight as to why nutrition counseling has failed to produce long term lifestyle changes.

Ross, Rakow, and Bush (1980) wrote that "a major challenge in applied education concerns the question of how to adapt instruction to individuals" (p. 312). Problem solving in real life differs from hypothetical problem solving in the classroom. Heppner, Hibel, Neal, Weinstein, and Rabinowitz (1982) noted that people in hypothetical laboratory settings react differently when faced with cognitive problems having real consequences. For those who must help people solve real problems, little concrete information exists. Heppner et al. (1982) cited recent literature reporting the results of investigations of individual differences in problem-solving ability among people and found that self-perception of ability to solve the problem was an important component of success. Those who perceived that they were capable of problem-solving were more successful than those who perceived that they were not. However, Heppner et al. found that the nature of the problem to be solved was also a critical

variable in terms of perceived success. Problem-solving differences were found for cognitive, behavioral, and affective components of the participants' personalities. Therefore, those who teach problem-solving skills must realize the multifaceted nature of the personality variables to be instructed.

Another often overlooked component of weight control programs has been motivation. Good and Brophy (1987) found that teacher effectiveness was related to ability to motivate students. When analyzing intentional learning, it has been difficult to separate student motives, goals, and strategies. Motives have been defined as hypothetical constructs that explain why people behave as they do. Goals have been defined as the immediate objectives of behavior and strategies as the methods used to both achieve the goal and respond to the motive. In the setting of weight control programs, dietitian-teachers are responsible for teaching and motivating clients who respond to hunger (motive) by going to the refrigerator (strategy) to get food (goal). The purpose of the weight control program is to teach appropriate motives, strategies, and goals.

Good and Brophy (1987), in synthesizing the research on motivation, wrote that effort in a learning situation was dependent on expectancy and value. The effort expended on a task was found to be a product of expectancy and value. Expectancy was defined as the degree to which people expected that successful task performance resulted

from application of self. It was also defined as the degree to which people believed that they would receive the expected rewards from successful task performance. Value was defined as the degree to which individuals valued the rewards. For effort to be expended in a situation, it was assumed that both factors were required.

Also, they noted that for motivational strategies to succeed four preconditions were necessary. First, a supportive environment is required. Second, an appropriate level of challenge or difficulty must exist. Third, there must be meaningful learning objectives and, fourth, the teacher must moderate and appropriately vary the use of both learning and motivational strategies. Without these preconditions, motivational strategies do not succeed.

The effective traditional classroom teacher has awareness of the individuality of students and has developed a repertory of teaching and motivational strategies to facilitate learning. The typical dietitian is not trained in either awareness or repertory. For learning to succeed, dietitians must become better educators. As health professionals become aware of individual differences among the obese, specific problem areas may be more easily targeted for remediation and change. Programs may also be more readily adapted to meet specific educational needs.

Ideal Body Weight

Obesity is a disease affecting health and longevity. The National Institute of Health (NIH) of the U. S. Public Health Service

defined obesity as an excess of body fat causing health impairment.

At a Consensus Development Conference (CDC) on the Health Implications of Obesity held in February, 1985, the panel concluded that health risk increased as a positive correlation to weight. They recommended nutritional intervention for persons with a body weight of 20% or more above ideal (Burton & Foster, 1985). Although 20% above ideal weight was an arbitrarily chosen designation for obesity, Schulz (1986) indicated that there was no safe level of overweight.

Schulz (1986) noted that height and weight tables were developed from mortality statistics with health risk assigned on the basis of height-weight combinations yielding the lowest rates of mortality. The association between increased overweight and decreased longevity has always been inferred since the clinical proof is an ethical impossibility. However, life insurance actuaries have demonstrated the increase in mortality rates in overweight individuals when their obesity is combined with diabetes, digestive diseases, cerebrovascular disease, coronary heart disease, and cancer. Overweight has also been associated with increased mortality in young people (Garrow, 1979).

In 1959, the Statistical Bureau of the Metropolitan Life Insurance Company published a table of desirable weights associated with the lowest mortality rates. Until this time, weights listed were the average values gathered from the population. Presentation of desirable or "ideal" weight was based on the issuance of 4.9 million

insurance policies between 1935-1953. The Statistical Bulletin for November-December, 1959, contained the following statement:

Control of body weight, although not easily achieved, is of vital importance for the health and longevity of the American people. It involves a proper balance between food intake and expenditure of energy . . . there is a need for a change in the dietary habits of many adult Americans. (p. 4)

The height and weight tables were revised in 1983 and were based on 4.2 million policies issued between 1950-1971. In The Statistical Bulletin for January-June, 1983, the new weight tables were described as a "health education tool." In the report, it was stressed that weight recommendations were again based on longevity information. Maintenance of weight at recommended levels did not insure against disease nor did it guarantee optimal appearance.

Few would dispute the adverse physiological and psychological effects of obesity. Yet, the etiology and treatment of obesity are still poorly understood and managed. At the National Institute of Health Consensus Development Conference (NIHCDC) held in 1985, future directions for research in obesity were projected and the first one listed was the identification of "predictors of adult obesity in infancy and childhood" (Burton, Foster, Hirsch, & VanItallie, 1985, p. 159).

Predictor Variables

An emphasis on intervention in obesity was the first goal of the 1985 conference. While intervention may help decrease the number of children who later become obese adults, it is not a complete solution to the societal problem of obesity. Many adults become obese in

adulthood. Therefore, researchers must locate predictors of obesity in the adult population.

In reviewing obesity research, Brownell (1984) identified four problems with the literature as (a) weakness in construct identification and measurement, (b) failure to show differences between normal and overweight subjects with treatment, (c) lack of analysis between research designs, and (d) lack of standardization of methods and assessment devices. He outlined three categories of predictor variables in an attempt to organize the literature. He named these categories environmental/demographic, behavioral, and psychological/cognitive predictors. Brownell's categorization was used to group and examine predictor variables in the next section of this chapter.

Environmental/Demographic Predictors

Predictors studied for relationship to weight reduction include subject sex, age of obesity onset, subject age, family history, personal weight history, social class, ethnic background, religious affiliation, level of education, and ordinality. Also studied have been marital status, marital history, and social support.

Stunkard and McLaren-Hume (1959) investigated the sex of a subject as a predictor of obesity. They reported a greater weight loss in males than in females. Weiss (1977) later challenged these findings "because of confounding variables and a lack of uniform and

appropriate criteria for success" (p. 194). Other investigations have failed to show significant differences in weight loss based upon subject's sex (Cooke & Meyers, 1980).

The age of obesity onset was proposed as a predictor of treatment success but comparisons among studies have been complicated by differing definitions of juvenile-onset obesity and varying success criteria and study methods (Weiss, 1977). Hirsch, Knittle, and Salans (1966) found that in humans, fat cell number was determined by nutritional experience during peak periods of growth. Fat cells were formed only during these growth periods. Therefore, once adult status was reached, fat cell number was fixed. Once fat cell number was fixed, obesity resulted from enlargement of the existing adipose cells rather than formation of new adipose tissue. Based on this information, it was believed that obesity in children resulted from both increased fat cell number (hyperplasia) and increased fat cell size (hypertrophy). Due to the existing hyperplasia, hypertrophy, and habit strength, it was hypothesized that juvenile-onset obesity was more difficult to treat than adult-onset. Experimental results supported this hypothesis. Although age of obesity onset correlated with weight loss ability, Weiss (1977) and Cooke and Meyers (1980) suggested it was not a significant predictor for successful weight loss. Rather, they concluded that identification of this variable should lead to early obesity intervention strategies in susceptible individuals.

Age was studied in relation to weight loss ability but most studies did not show a significant difference in weight loss among subjects based on age (Cooke & Meyers, 1980; Weiss, 1977). Hoiberg, Berard, and Watten (1980) found that subject age was positively related to factors implicated in the etiology of obesity and young subjects were most likely to show weight status positively correlated to juvenile-onset obesity. Older subjects showed correlations with factors such as emotional state and food obsession.

One variable that showed promise as a predictor for obesity was family history. Children with two overweight parents were three times more likely to be overweight than children with two normal weight parents (Garn & Clark, 1976).

Personal overweight history was shown by Hoiberg et al. (1980) to be a predictor when considered with subject age. However, Weiss (1977) concluded that research evidence for this predictor alone was generally negative even when the variables of dieting frequency, food intake patterns, snacking habits, and emotional eating were included.

General demographic variables studied included social class, ethnic background, religious affiliation, level of education, and ordinality. None has demonstrated a consistent relationship with successful weight reduction. Investigation of social class revealed a higher incidence of obesity among lower versus higher classes. However, since social class is usually not reported in most studies,

data related to this variable may be confounded with other variables. This same confounding was found by researchers investigating ethnic background and religious affiliation (Brownell, 1984; Cooke & Meyers, 1980; Weiss, 1977).

Behavioral Predictors

Behavioral predictors of successful weight management include exercise, eating style, and self-reinforcement style. Exercise has been uniformly demonstrated as a predictor for both weight loss and weight maintenance. Brownell (1984) found that those who exercised lost more weight than those who did not. Jacobs and Wagner (1984) found significant differences among obese, normal weight, and previously obese subjects with regard to hours spent in physical activity. Obese subjects exercised least. In a 1-year follow-up study, Miller and Sims (1981) found that 90% of successful dieters engaged in regular aerobic exercise.

Awareness of eating style and behavior modification have been used successfully to facilitate weight loss in certain individuals. It was assumed that the obese had an eating style that perpetuated their obesity. The goal of behavior modification was to identify and remediate those maladjusted eating habits. Miller and Sims (1981) found that 100% of successful dieters continued to use behavior modification techniques once goal weight was achieved. Brownell (1984) claimed that behavior modification enhanced weight maintenance

once goal weight was achieved. However, Cooke and Meyers (1980) cited a lack of evidence to support the existence of an obese eating style. They claimed that eating style, as a predictor, was useful only upon initial identification of detrimental eating patterns.

A variety of behaviors has been studied for differences between normal and overweight populations. Many believed that eating style was a causative factor in the etiology of obesity and that elimination of the "obese eating style" would assist maintenance of normal weight. Eating style components studied included the rate of eating; number of bites, sips, and chews; and total time spent eating. It was assumed that the obese ate more quickly, took fewer but larger bites, and spent more time eating.

Rosenthal and Marx (1978) studied differences in eating patterns between obese and normal weight subjects. The groups studied included normal weight subjects, those completing a behavioral program for weight control, and those on a waiting list for the program. Also compared were successful and unsuccessful dieters from the weight control program.

Subjects were videotaped while eating and differences were recorded for these behaviors: number of bites, sips, and chews; the number of times utensils were placed on the table between bites; and meal duration. Rosenthal and Marx found that overweight and normal weight subjects showed no differences in eating style. Rather,

differences were seen between participants and nonparticipants of the behavioral program. No behavioral differences were seen between successful and unsuccessful dieters from the weight control program.

Following this study, the social influence of others was investigated by Rosenthal and Marx (1979) as a causative factor for overweight. Overweight participants were subjected to the influence of a model who used both appropriate and inappropriate eating behaviors. Successful and unsuccessful dieters from a behavioral program and normal weight individuals were studied. Rosenthal and Marx also compared the eating behaviors of those eating alone to those eating with others. They postulated that all normal weight and overweight individuals would be affected by the eating behavior of the model but that the successful dieter group would be influenced least.

Rosenthal and Marx found that the model did influence the eating behavior of others. Subjects who ate in the inappropriately modeled situation ate more than those in the appropriately modeled situation. Although members of the weight control program ate less than nonmembers, there were no intake differences between successful and unsuccessful dieters.

Problems in these two studies by Rosenthal and Marx existed because of a lack of experimental control. Information about typical food habits was not gathered nor were participants given instructions about food intake to standardize conditions prior to the study.

Dieters were labeled as "successful" or "unsuccessful" based upon an arbitrary target of a 12-pound weight loss in the behavioral program. The criterion used to define overweight was 10% over ideal weight; typically, 15-20% above ideal is used. Finally, the normal weight control group was not investigated for prior history of dieting or previous involvement with a behavioral program. Rosenthal and Marx (1979) wanted to study the social influence of a model on eating behavior. However, in that study the subject and model were not permitted to converse. This created an artificial social environment with results that may not generalize to the obese population in a typical social setting.

Following the studies by Rosenthal and Marx, Kingsley and Wilson (1977) studied the weight maintenance patterns of 76 subjects who completed a behavioral weight control program. Behavioral programs were chosen for study since they had been found to produce greater weight losses with reportedly lower attrition rates than other programs. To further study weight maintenance, in this study booster sessions with a therapist were added following completion of the program. Two groups were studied. The first was a behavioral treatment group with subjects assigned to either individual or group therapies. The second was a nonbehavioral treatment that used social pressure to produce weight loss. Post-treatment booster sessions were added to the programs of half the participants in each group to help compare

the therapeutic results of each program across time. Kingsley and Wilson expected that the behavioral programs would be more effective than the nonbehavioral. Also, the group attending the booster sessions was expected to achieve better weight maintenance results. Sessions occurred at 3, 6, 9, and 12 months following conclusion of the programs.

Initially, Kingsley and Wilson found that the behavioral programs produced significantly greater mean weight loss than the nonbehavioral but no significant differences were reported between the two behavioral programs. At the 3-month follow-up, booster sessions were found to contribute significantly to weight loss for all three treatment groups. However, this difference was not noted at later follow-up meetings, demonstrating that booster sessions had no long term advantage.

Kingsley and Wilson concluded that behavioral treatments caused greater initial weight loss but that across time results did not differ from other types of treatment. They suggested that successful weight loss and maintenance resulted from internalization of instructions and continued practice of behavioral techniques.

Another predictor studied for a relationship to successful weight control was self-reinforcement style. Self-reinforcement style was identified and studied by Bellack, Schwartz, and Rozensky (1974) and Bellack and Tillman (1974). Bellack et al. postulated that differences

in self-reinforcement style affected self-control. Those with high patterns of self-reinforcement were expected to perform better in weight control programs that utilized self-control techniques (Weiss, 1977).

Cooke and Meyers (1980) stated that

self-reinforcement may be important in allowing the individual to obtain sufficient immediate rewards to sustain the long term self-denial and delay of gratification involved in weight loss efforts. (p. 66)

Brownell (1984) defined self-control as

a behavioral skill—the ability to recognize and acknowledge positive achievements and the subsequent ability to reinforce oneself either emotionally or materially for the accomplishments. (p. 545)

The variable of self-control has greatest value in long-term maintenance when one is most dependent on internalized control.

Bellack, Schwartz, and Rozensky (1974) studied the relationship between self-control and external control. Self-control techniques have been used successfully in other areas of behavior management. Researchers for this study employed a therapist who provided the initial program outline and instructions for weight reduction to participants. The subjects and therapist then met on a regularly scheduled basis until desired behavioral goals were met. The therapist provided external control through contact with the subjects. The purpose of external control was to encourage the subjects' use of self-control.

Bellack et al. assigned 28 subjects to three groups with varying levels of external control. The first group met regularly with the therapist, the second group corresponded with the therapist through

the mail, and the third group had no therapist contact. After completing the 8-week program, differences in weight loss were compared among the groups.

Results indicated significantly more weight loss for the two groups receiving therapist contact than the no contact group, but no significant differences were found between personal contact and mail contact. Weight loss and self-monitoring showed a high positive correlation. Bellack et al. concluded that use of external control positively affected subject use of self-control.

The relationship between self-reinforcement and self-control was further studied by Rozensky and Bellack (1976). In self-control programs, participants are expected to self-monitor, self-reinforce, and demonstrate effective stimulus control. Self-control is believed to be a learned response. This study by Rozensky and Bellack was designed to measure the relationship between sources of control and differences in self-reinforcement style as it affected performance in a weight control program.

Thirty-seven subjects were labeled as either high or low self-reinforcers on the basis of a visual word identification test. These two groups were subdivided further and assigned to either a self-control, external control, or minimal control group for weight reduction. Those in the self-control group had mail contact with a therapist. The external control group had mail contact with a

therapist plus a financial contingency where subjects were monetarily rewarded or penalized weekly for weight status. The minimal contact group had no therapist contact.

Those in the self-control group lost significantly more weight than those in the other groups. High self-reinforcers in the self-control group lost more weight than any other group. In the self-control group, high self-reinforcers performed better than low self-reinforcers but in the external control group the reverse was true. These results led to the conclusion that a self-control program was effective in producing weight loss for self-reinforcing subjects.

The effect of self-reinforcement was studied further by Carroll, Yates, and Gray (1980) who replicated the preceding study. The component of self-evaluation was added and studied for a relationship to weight loss. Researchers expected that a relationship between self-reinforcement and self-evaluation would show a lower correlation in nonbehavioral than behavioral programs. A lower correlation was predicted since nonbehavioral programs do not emphasize behavior modification and reinforcement for behavioral changes made. They also expected a positive relationship between self-evaluation and performance, regardless of program type, if self-evaluation was at all related to weight loss success.

Seventy-two subjects were assigned to either a behavioral, nonbehavioral, or delayed treatment group. They were measured for

self-evaluation, self-management, and self-monitoring capabilities at program onset.

Carroll, Yates, and Gray found significantly more weight loss in the behavioral program group. They found that the interaction between self-evaluation and treatment method was a significant predictor for successful weight loss. They also found that of 11 other behavioral predictors studied, self-evaluation was the only significant predictor of success. They concluded that the variables enabling weight loss success differed from those enabling maintenance.

Psychological/Cognitive Predictors

These predictors have included levels of anxiety, depression, impulsiveness, emotional status, motivation, cognitive restructuring, and weight increase threshold. Personality characteristics were examined by Cooke and Meyers (1980) who noted that anxiety, depression, body image, and profiles from the Minnesota Multiphasic Personality Inventory (MMPI) showed no correlation with weight loss. Pomerantz, Greenberg, and Blackburn (1977) studied MMPI profiles of overweight subjects in a weight control program. They concluded that the overweight were significantly more "passive, dependent, lacking in aggressiveness, and lacking in self-assertiveness" (p. 733). Consequently, they recommended the addition of an assertiveness training component to weight control programs. Bjorvell, Edman, Rossner, and Schalling (1985) administered the Karolinska Scales of

Personality (KSP) to a group of 107 obese inpatients at Karolinska Hospital, Stockholm. They concluded that the obese exhibited an impulsiveness syndrome characterized by somatic anxiety, muscular tension, impulsiveness, monotony avoidance, and low socialization.

Emotional status was examined for a correlation to obesity. Hoiberg, Berard, and Watten (1980) found a stronger correlation for men than women in a Food Obsession Composite that included measuring feelings of helplessness related to controlling food intake. Male subjects reported feelings of powerlessness in eating situations while female subjects showed a stronger correlation with compulsive overeating.

Data related to the variable of motivation were reviewed by Cooke and Meyers (1980). It had been generally believed that motivation would show a positive relationship to weight loss and a negative relationship to program dropout rate. Unfortunately, Cooke and Meyers found that these assumptions had been measured indirectly and motivational data were gathered post hoc. Many had assumed that those who dropped out of programs or who did not lose weight failed due to a lack of motivation. However, without more direct information, these conclusions could not be drawn. They concluded that more direct study of this variable was needed.

Cognitive variables have received attention with regard to their relationships to weight reduction. The replacement of negative

self-talk with positive self-statements is termed "cognitive restructuring." At a 1-year follow-up study, Miller and Sims (1981) found that regular use of positive self-statements was practiced by 75% of successful dieters who had reached goal weight. Cooke and Meyers (1980) cited evidence supporting the importance of cognitive restructuring for continued weight loss efforts. Another cognitive concept, weight increase threshold, rests on the hypothesis that there is institution of self-corrective measures regarding food intake once a weight threshold is reached. It has not been determined if this is an acquired or learned ability and more information is needed.

Internal Versus External Regulation of Intake

Many psychological theories have been proposed to explain obesity. In 1957, Kaplan and Kaplan hypothesized that obesity resulted from behaviors learned in childhood to cope with stress and anxiety. As the child grew, a behavioral pattern formed where anxiety led to eating which caused obesity and more anxiety. The result was a vicious cycle of increasing amount of anxiety and weight gain. Kaplan and Kaplan called this the psychosomatic theory of obesity. They postulated that obese individuals overate in response to internal cues.

Alternatively, Schachter (1971) proposed that individuals were responsive to environmental or external cues. He called this theory "externality" and believed that overeating resulted from cues such as the sight or smell of food, habit, food taste, or food

availability. Schachter viewed hunger for normal weight individuals as an interaction between internal cues and external environmental signals with physiological state dictating intake. Hunger in the obese was believed to be externally manipulated with little regard for internal state.

Schachter, Goldman, and Gordon (1968) proposed that while hunger was not an objective psychological construct that could be easily measured, it was physiologically the same for all. They believed that intake for normal weight subjects was regulated by internal signals like gastric contractions or blood glucose level while the intake of the obese was believed to be externally regulated.

Bruch (1961) believed that obese subjects could not discriminate between arousal for emotional states like fear and the physiological symptoms of hunger. Since the obese were unable to correctly discern the meanings of internal signals, they turned to the environment for eating cues.

Based on Bruch's hypothesis, Schachter, Goldman, and Gordon expected that the intake of normal weight individuals would correspond to their current level of satiety. The obese were expected to show no relationship. Regarding emotional state, normal weight subjects were expected to eat less when frightened or anxious than when calm. The obese were not expected to demonstrate any differences in intake based on emotional state.

To test these hypotheses, levels of anxiety and degree of satiety were manipulated for normal weight and obese subjects. It was expected that the obese would not show changes in intake based on internal signals and would consume the same amounts of food when anxious, calm, with a full stomach, or with an empty stomach. Normal weight subjects were expected to decrease intake when anxious and when in the fed condition.

Schachter et al. (1968) found that obese subjects ate approximately the same amount of food following a sandwich preload as with empty stomachs. Normal weight subjects showed a decreased intake following a sandwich preload. When emotional state was manipulated, the obese ate more than those of normal weight, although the differences between their intakes were not significant. Surprisingly, the total average intakes for both groups were almost the same. The obese ate 18.3 crackers and those of normal weight ate 18.1 crackers.

Schachter et al. attempted to measure the effect of eating on fear reduction using a subjective questionnaire. They found that the obese did not report a lessening of anxiety following eating. This finding demonstrated a lack of support for the psychosomatic theory. Physiological condition of the stomach showed that normal weight subjects ate more crackers than the obese in the unfed condition but these differences were not significant. The intake for obese subjects was approximately the same in each of the four experimental conditions.

Although these results did not cause rejection of the psychosomatic theory, they led Schachter, Goldman, and Gordon to propose externality as a viable theory for the observed behavioral differences between the obese and those of normal weight.

A criticism of this study was the reliance on the premise that gastric contractions and hypoglycemia regulated hunger in normal weight subjects but not in the obese. Rodin (1981) noted that neither mechanism had been demonstrated to regulate food intake or signal hunger. Another criticism was the use of subjective instrumentation to assess anxiety level. The lack of rigor produced inconclusive results. There was poor control of food intake prior to the experiment and no baseline intake data were determined. Therefore, typical patterns of food consumption could not be measured between groups. Finally, data between obese and normal weight subjects were not analyzed for significant differences in each of the four experimental conditions.

McKenna (1972) also compared the effects of anxiety and food cues on the behavior of normal weight and obese subjects. He wanted to compare differences between the psychosomatic theory and theory of externality as explanations for obesity. He hypothesized that the psychosomatic view would be supported if anxious, obese subjects ate any type of food offered following a sandwich preload and then reported a lessening of anxiety. Support for externality would be

demonstrated if calm, obese subjects ate significant amounts of appetizing food following a preload that was designed to eliminate hunger.

McKenna found that as anxiety increased, the obese ate significantly more food than those of normal weight although they reported that eating did not lessen their feelings of anxiety. These findings supported the psychosomatic theory of obesity with the exception of the report that eating did not lessen anxiety. With the condition of low anxiety, it was unexpectedly found that normal weight subjects ate more than the obese. These results failed to support externality, leading McKenna to support the psychosomatic theory as an explanation for the behavioral differences between obese and normal weight subjects.

Problems with McKenna's design included the use of self-report instruments to assess both level of anxiety and hunger status. A more valid measurement of these variables would have produced more generalizable results. McKenna also failed to standardize preexperimental eating conditions. He used the eating behaviors of unfed, normal weight subjects as the baseline for eating behaviors of the obese. Finally, the technique used to induce anxiety may have had a variable effect on subjects. Those presensitized to hospital or clinical environments may not have demonstrated the desired increase in anxiety level.

Reports of internal regulation of eating by those of normal weight led Wooley (1972) to investigate this hypothetically superior feedback mechanism. She postulated that regulation of food intake included a cognitive component. The purpose of Wooley's study was to measure the effect of cognitive factors on reported feelings of satiety and actual food intake in normal weight and obese subjects. Also, she compared intake regulation for both normal weight and obese subjects while controlling the cognitive component.

Wooley found that neither group demonstrated a physiological regulation that differed from cognitive beliefs about food composition. Cognitive factors were found to influence both perceived satiety and consumption patterns in normal weight and obese subjects. Wooley concluded that for short term food regulation, cognition played an important role in food intake and perceptions of satiety.

Slochow (1976) believed that an unexplored implication of the psychosomatic theory was the notion that overeating in the obese was triggered by diffuse, undefined internal conflicts. This vague uneasiness was hypothesized as the cause of overeating. Slochow wanted to test the psychosomatic theory and theory of externality as explanations of observed differences between obese and normal weight subjects.

According to the two proposed theories, the food intake of an externally manipulated obese person was expected to be affected only

by food availability. Emotional state, its absence, or a lack of identification of the source of arousal was not expected to affect intake. In contrast, according to the psychosomatic theory, intake of obese subjects was expected to increase as emotional state was manipulated. Whether the subject could identify the source of emotional arousal was believed to be irrelevant.

Slochow predicted that obese subjects would respond to their state of arousal and respond differently to the presence or absence of a label for the arousal. It was predicted that the eating behavior of calm, obese subjects would not be affected by the presence or absence of the label. A lack of identification of the source of arousal was expected to increase the intake of the obese, with a resulting lessening of emotional arousal with eating. Intake for normal weight subjects was not expected to change with manipulation of emotional state and normal weight subjects were expected to eat less when aroused than when calm.

As expected, Slochow found that emotionally aroused obese subjects ate significantly more food when they could not identify the source of arousal. Normal weight subjects did not respond to emotional manipulation and ate most when they were unfed. Their results correlated with level of satiety rather than the level of emotional arousal.

Slochow concluded that findings from previous studies (McKenna, 1972; Schachter, Goldman, & Gordon, 1968) needed revision concerning

the interaction between anxiety and eating in the obese. Based on previous studies, it had been concluded that anxiety did not cause overeating in the obese. Schachter et al. (1968) found that the obese consumed the same amount of food regardless of emotional state. McKenna (1972) found that anxiety alone did increase the intake of the obese.

Slochowier had postulated that intake was dependent on the subject's knowledge of arousal source. She concluded that arousal by an unidentified source, such as emotion, may be misinterpreted by obese individuals and falsely labeled as a hunger signal. This lack of identification of arousal source was cited as the cause of overeating by the obese in this study.

A shortcoming of Slochowier's study was that auditory signals were used with verbal descriptions of what they meant to manipulate arousal levels. Based on Wooley's (1972) findings demonstrating a cognitive component in food regulation based on verbal instructions given about the food, cognitions, rather than emotional labels, may have been measured.

With so much attention given to the emotional state of the obese, Lowe and Fisher (1983) studied the relationship between intake and emotional status. It was expected that emotional distress contributed to an increased food intake. Lowe and Fisher found that while obese subjects were more emotionally reactive than those of normal weight,

emotional overeating resulted from increased snacking rather than increased meal amounts. When in "negative" moods, obese subjects consumed significantly more food for snack time than normal weight subjects. Lowe and Fisher concluded that negative emotional overeating contributed to obesity.

Rodin, Slochower, and Fleming (1977) measured responsiveness to external and sensory stimuli in four experiments. In the first, they found a weak correlation between externality and degree of obesity. They concluded that external responsiveness led to weight gain but did not predict level of weight maintenance. In the second, they found that age of obesity onset produced a significant interaction with degree of overweight. Slightly overweight females with juvenile-onset obesity demonstrated greater externality than adult-onset counterparts. For the adult-onset group, externality was positively related to degree of overweight. Notably, external responsiveness did not change with weight loss in either of these two studies. Data from experiment three led them to conclude that obese subjects ate more than those moderately overweight when food cues were visually prominent in the environment. They concluded from the fourth experiment that overweight individuals exhibited heightened taste responsivity when compared to those of normal weight. Following weight loss, responsivity increased further. Enhanced responsivity was demonstrated by increased consumption of the desirable food.

DeYoub (1978) measured the suggestibility of both normal and overweight subjects. He hypothesized that if the cognitive behavior of the obese responded to external cues, then there should be increased susceptibility to hypnotic suggestions. A positive relationship between externality and susceptibility would demonstrate a need for the inclusion of hypnosis in weight reduction programs. DeYoub also expected to find a positive relationship between suggestibility and percent overweight.

Instead, he found that the obese, as a group, were not more suggestible than those of normal weight. But, while results failed to support the notion of increased suggestibility in the obese, they did not discredit externality as a viable theory of obesity since the relationship between suggestibility and externality was hypothetical.

Herman, Olmsted, and Polivy (1983) identified externality as a variable for both normal and overweight individuals. However, they concluded that externality in obese individuals resulted from chronic dieting. This notion contradicted Schachter's original concept that externality resulted in obesity. Herman, Olmsted, and Polivy concluded that most obese individuals were externally oriented. Realizing that most research regarding externality had been done in a laboratory setting, they studied externality in a more natural setting. Using a French restaurant, dessert-related cues were manipulated for preselected patrons. The goal was to evaluate the

effect of social pressure, rather than food cues, on food choices.

This goal may be restated as a measurement of externality regarding food choices.

Herman, Olmsted, and Polivy found that the obese did not differ from normal weight subjects when either external (visual) food cues or social cues were absent. When visual cues were presented, the obese were significantly more likely than those of normal weight to select the displayed dessert. Obese subjects also ordered recommended desserts more frequently than normal weight subjects. Herman et al. concluded that obese subjects demonstrated externality and a reliance on social influence regarding food choices.

Unfortunately, researchers in this study did not control the influence of many confounding variables such as the effect of individual food intake for the day, calorie content of subject meal choices, or alcohol ingestion. The rating system used to categorize patrons was subjective and open to error. There was no way to standardize the effects of the differing personalities at respective dining tables. The only independent variable measured was dessert selection. Use of this variable may underlie a basic misconception of obesity resulting from specific food choices rather than total food consumption or food pattern. Rigorous control of extraneous variables was absent in this study and since externality was not clearly measured, conclusions must be carefully drawn and generalized.

Gardner, Brake, Reyes, and Maestas (1983) concluded that externality theory needed revision since they did not find data to indicate that the obese perceived things differently from those of normal weight; rather, the difference was in response to what had been seen. They suggested that

obesity somehow leads to an altered response bias toward stimuli. . . . Any number of factors might be responsible for this altered response bias including motivation, attitudes, attention, or any number of social factors. This research suggests that future exploration of the role of these variables in obesity might be more productive than continued examination of possible differences in sensory processing. (p. 254)

Rodin (1981) evaluated the status of externality as a viable theory of obesity. She cited many failures in externality literature. First, differences between normal and obese subjects were not demonstrated for the externality construct. Externality was found in both populations. Second, sampling problems did not utilize standard definitions for weight status. Overweight labels were sometimes subjectively assigned (Herman, Olmsted, & Polivy, 1983). Third, external responsiveness had not been well-defined by researchers so it had not been uniformly measured. Since responsiveness to taste and smell involve different receptor sites than those for vision and hearing, conditions that have elicited a response from one sense may not generalize for responses from the other senses.

Rodin suggested that overweight resulted from an interaction between internal and external cues. Internal arousal resulted from

increased interest in the environment in addition to physiological mechanisms. Rodin concluded that

onset and degree of overweight are determined by a combination of genetic, metabolic, psychological and environmental events. . . . It may never be possible to find the "magic bullet," since obesity is not a single syndrome, has no single cause, and therefore probably does not have a single cure. (p. 370)

Locus of Control

Julian Rotter's social learning theory of personality focused on the learning of behavior through social experiences. Rotter believed that personality changed as one encountered new experiences. He hypothesized that many factors influenced behavior. Rotter claimed that

we have a subjective expectation of the outcome of our behavior in terms of the reinforcement that will follow it. We estimate the likelihood of behaving in a certain way will lead to a particular reinforcement, and we regulate our behavior accordingly. We place different values or degrees of importance on different reinforcements, judging their relative worth in various situations. (cited in Schultz, 1981, p. 323)

Four terms are used to explain Rotter's social learning theory: behavior potential, expectancy, reinforcement value, and psychological situation. Behavior potential refers to the likelihood of a behavior in a given situation. It is affected by external stimuli and internal cognitive perceptions. Expectancy explains the belief that behavior will be followed by a predictable reinforcement. In new situations where predictions from the past have not been possible, generalization allows expectancy development from similar situations. Reinforcement

value stresses individual choice of possible reinforcements since all are not viewed as equally desirable. Finally, psychological situation describes the sum of the internal and external environments and the influence of each upon the other. Rotter believed that individuals reacted to a psychological situation based upon the perception of external stimuli (cited in Schultz, 1981).

Rotter developed a forced-choice self-report questionnaire called the Internal Versus External Locus of Control Scale (I-E Scale). He developed this scale to determine an individual's orientation to and expectation about reinforcement. He defined two personality variables, internal and external locus of control. He believed that those with an external locus viewed success as environmentally-dependent while those with an internal locus viewed success as self-dependent (Rotter, 1966). The I-E Scale was developed with college students. The purpose was to allow a broad overview of prediction across a variety of situations, not to be a situation-specific predictor of success.

To predict locus of control one must either control reinforcement or measure it. One frequent conceptual problem with measuring this construct has been the failure to treat reinforcement as a variable.

Criticisms of the locus of control literature indicate many I-E researchers have used skill and chance situations to generate behavioral outcomes. They have not measured the same concept as the constructs

internal and external control of reinforcement. Researchers have also tried to predict achievement or success using internal and external measurements. This practice has not provided reliable data as it is difficult to guarantee that the measured behavior is reflective of the individual's attitudes. One may have internal attitudes but external behaviors.

A criticism of the I-E instrument has been that the scale is subject to testing conditions and purposes of the researcher. It is possible that bias may skew the results of groups tested. For example, in the area of weight control, overweight individuals who have been previously counseled in behavioral weight control programs have been taught that successful weight loss is in their control. These individuals may measure a more internal locus of control than expected due to previous teaching (Rotter, 1975).

Many have used locus of control to predict successful weight loss or to establish a personality profile of the overweight individual. Bellack and Tillman (1974) explored and compared the responsiveness of internals and externals to environmental feedback by examining the relationship between locus of control and self-reinforcement style. Using visual discrimination in a recognition memory task, the researchers found that internals showed a positive relationship between accuracy of performance and administration of self-reinforcement. Bellack and Tillman suggested that locus of control was not an ongoing aspect of behavior, rather; it is manifested with certain stimulus conditions.

Kincey (1980) examined the relationship among target setting, self-reinforcement style, and locus of control as a predictor for weight loss. He expected that externals would lose more weight if given immediate rather than delayed self-reinforcement. He also believed that giving externals low, realistic expectations for weight loss would produce better results than delayed self-reinforcement. His hypotheses were based on learning theory findings that behavioral frequencies were affected by use of immediate rather than delayed positive reinforcement. Based upon locus of control theory, externally controlled individuals were expected to be particularly sensitive to extinction of behavior when positive environmental reinforcement was absent.

Kincey found that those given high targets for weight loss lost more weight than those given low targets. Contrary to expectation, externals did not lose more weight when given low target weights. There was a tendency for internals to lose more weight when given high targets although only 12 individuals were in this category. The two conditions for self-reinforcement showed no significant differences for external subjects.

There were many notable flaws in Kincey's experimental design so conclusions must be carefully drawn. First, there was a 65% attrition rate and the final analysis was based on only 20 scores. Second, there was no therapist involvement in this program and participants

were totally responsible for their own progress. Lack of therapist involvement has been a demonstrated liability in terms of successful weight loss (Bellack, Schwartz, & Rozensky, 1974). Third, Kinsey used weight of 7% above ideal to define his overweight population rather than the standard 15%. Fourth, a nonstandard weight reference, Montegriffo (1968), was used as the touchstone for weight classification.

Schallow (1975) studied undergraduates involved in a variety of self-modification projects, six with weight reduction. He found that successful students had a significantly internal locus of control. He suggested that success resulted from the perception of controlling one's own behavioral outcome.

Gormanous and Lowe (1975) reported that on the basis of locus of control alone, obese individuals could not be distinguished from those of normal weight. Locus of control could not be used to predict weight status.

Thomason (1983) studied attitudes among the obese to determine whether I-E differences existed. He discovered that obese individuals were more external only in certain areas. When fatalism, social system control, and self-control were measured on the Reid-Ware Three Factor I-E Test, obese subjects were significantly more external than normal weight subjects in the area of social system control. This indicated a perceived lack of control regarding impulses, emotions, and desires.

Tobias and MacDonald (1977) investigated the relationship between locus of control and weight loss. They found that perceived responsibility alone would not precipitate weight loss.

Kincey (1981) studied the relationship between locus of control and pattern of weight loss. He found that internals lost significantly more weight than externals starting at the eighth week of a weight control program. For the first seven weeks of the program, differences between the two groups were not significant. He also found that internal control orientation correlated positively with high extraversion and self-acceptance from the Short Eysenck Personality Inventory and Berger's Self-Acceptance Scale, respectively. Shortcomings of this study were the 58% attrition rate and use of a nonstandard weight criterion.

Locus of control has also been used to predict program membership and program completion rate. Hankins and Hopkins (1978) found that external individuals who joined weight control programs were no more successful in weight loss than those who were nonjoiners. Conversely, internals who were joiners were more successful than nonjoiners. Balch and Ross (1975) found that those with an internal orientation achieved more success in a weight control program and were less likely to drop out than were externals. They suggested using locus of control as a selection criterion for weight control program participants.

Bolocofsky, Coulthard-Morris, and Spinler (1984) found that the most successful members of a behavioral weight control program had a more internal locus of control. Those with an internal locus were also more likely to maintain their weight loss. Those most likely to drop out of the program were those with an external locus.

Set Point and Restraint Theories

Nisbett (1972) claimed that obesity was without any primary etiology once the physiological causes were removed. He suggested that since body fat stores were biologically determined, body weight was due to factors other than food intake. Nisbett hypothesized that some individuals were predisposed to obesity due to greater amounts of adipose tissue.

Goss (1966) found that cell number was static in the adult human. This meant that weight reduction efforts for adults involved reducing the fat content per cell rather than decreasing total fat cell number (Hirsch & Knittle, 1970). However, since adipocytes tend to remain lipid-filled, weight reduction efforts may be difficult. Vasseli, Cleary, and VanItallie (1984) summarized weight control efforts as having a "ratchet effect" where new cells could be added but rarely lost. They implied that body weight did not decrease because a minimum weight was determined by total adipocyte number and size. Nisbett concluded that those having a higher fat cell number remained "constitutionally fat."

Nisbett claimed that adiposity reflected two unchangeable variables: heredity and early nutritional experience. He postulated that the ventromedial hypothalamus was responsible for body weight regulation after citing evidence that the hypothalamus maintained the body's hunger and satiety centers. He theorized that the hypothalamus defended the adipose level or "set point" established by heredity and early nutrition.

To support the Set Point Theory, Nisbett cited studies of the eating behavior of hungry organisms. Among the behaviors noted were the amounts of food eaten, rate of eating, and effects of hunger on taste and taste responsiveness. Nisbett drew a parallel between the observed eating behaviors of hungry organisms and hungry humans. Then, he examined the emotional states, activity, and sexual levels of hungry organisms. He compared reported findings of hyperemotionality, decreased activity levels, and depressed sexual drives in hungry organisms to similar reports in hungry humans. Nisbett then took a quantum leap and paralleled hungry humans and obese humans citing the observed behavioral similarities and elevated free fatty acid levels as evidence that these groups existed in a state of chronic food deprivation.

To support the notion that the hypothalamus regulated eating behavior, Nisbett cited behavioral studies of rats with lesions of the ventromedial hypothalamus who exhibited increased food intake. The

observed similarities in eating behavior, activity level, and sexual appetite of hungry organisms, obese humans, and ventromedially lesioned rats were the basis of Nisbett's Set Point Theory. He concluded that obese humans lived in a state of starvation and that this chronic deprivation drove them to eat and overeat, thus resulting in obesity.

As researchers began to mount evidence against externality as an explanation for obesity, Nisbett emerged with the Set Point Theory that drew from psychological and physiological research. According to Nisbett, individuals with a body weight below set point were chronically hungry due to food deprivation. Lowered body weight also resulted in eating behavior with an external orientation.

Many have found that physiological evidence fails to support Set Point Theory as a viable explanation of obesity. Grill and Norgren (1978) investigated the hypothalamus as a regulator of food intake and found that in rats the caudal brainstem was the center for some feeding responses. However, they also noted that centers outside of the brain have been found to have a regulatory effect on intake. Sawchenko and Friedman (1979) noted that the liver contained feeding receptors sensitive to the physiological state of the body. The liver is the organ involved with the body's utilization of various energy substrates. Friedman and Strickler (1976) concluded that while the hypothalamus does not "determine a body weight set point" (p. 421) it may help regulate the peripheral metabolism.

Although Nisbett never demonstrated a valid explanation for obese-normal differences in weight based on Set Point Theory, the concept of "restraint" was built on its theoretical conditions. Herman and Mack (1975) hypothesized that normal weight subjects were either internally or externally oriented based upon body weight relative to physiological set point. They used the term "restrained" to describe normal weight subjects with body weight below set point. These individuals were also expected to demonstrate externality. "Unrestrained" was used to describe those with body weight close to set point. Herman and Mack expected unrestrained eaters to exhibit more controlled eating behavior (internality) since proximity to set point was expected to result in internal rather than external food regulation. Unfortunately, those supporting either internal and external regulation of intake have never demonstrated viable explanations of obesity.

However, to test the restraint hypothesis, the ice cream intake of 57 college age females was measured following milkshake preloads. After the preload, restrained subjects were expected to eat more ice cream than the unrestrained since the calorie bonus was expected to produce an override of their usually strict system of caloric control. Counterregulatory eating behavior was predicted for this group. Unrestrained subjects were expected to demonstrate regulatory eating behavior and decrease ice cream consumption following the preload.

Herman and Mack verified their hypothesis with results from experimental data. They found that restrained individuals ate

significantly more ice cream following the preload than unrestrained individuals. Therefore, they claimed that the unrestrained group showed regulatory behavior and internality by decreasing ice cream consumption after the preload. Externality was attributed to the restrained group when environmental food signals appeared to trigger increased food intake. Herman and Mack concluded that restraint rather than body weight was responsible for the externality demonstrated by the obese.

Three inherent problems have been found in restraint literature. First, external validity has not been demonstrated for the restraint questionnaire which arbitrarily defines "restrained" and "unrestrained" on the basis of a median split of the total scores for each group measured. Second, the proposed counterregulatory eating behaviors of the obese have not been studied directly. Promoters of restraint theory assumed that restrained eaters exhibited the counterregulatory eating habits of the obese, an assumption not tested. Third, it was not shown that restraint discriminated among obese and normal weight individuals. An interaction between weight and restraint was not clearly tested. Therefore, one could not conclude that restraint rather than weight better predicted eating behavior (Ruderman & Wilson, 1979).

Despite these notable flaws in the restraint hypothesis, research into restraint as an explanation of obesity continued as Herman and Polivy (1975) hypothesized that obese and normal differences were due

to degree of underweight relative to set point. Normal weight subjects were categorized as restrained and unrestrained based on a median split of restraint scores.

Theory for this study was based on premises drawn from externality and set point theories. Herman and Polivy first postulated that food deprivation resulted in parallel behaviors for obese and normal weight subjects. Second, they postulated that at set point obese subjects would behaviorally resemble those of normal weight. However, these conjectures raise the question of how one would discriminate between the two obese groups, one in a state of deprivation and one at set point. The sole criterion would appear to be the demonstrated eating behavior, but this variable could be experimentally affected by a host of other factors. The third premise drawn was that normal weight subjects who restricted their intakes and who were prone to overweight would behaviorally resemble the obese by exhibiting externality.

Restraint definitions included concepts from both externality and set point theories. Restrained normal weight subjects, those below set point, were expected to resemble Schachter's obese and demonstrate externality. Unrestrained normal weight subjects, those at or near set point, were expected to be internally regulated. Supporters of restraint theory concluded that behavioral differences within a normal weight population were due to body weights relative to set point. This conclusion omitted the possibility that externality resulted from

other sources such as learned behavior, present physiological state, affinity for particular foods, or impulse.

Externality and set point have not been shown to be valid constructs to predict differences in obese and normal weight individuals. Construct validity has not been determined for either theory and the use of their unproven definitions adds error to the restraint construct.

For the just described study, Herman and Polivy (1975) induced anxiety in subjects and expected that restrained normal weight individuals would exhibit externality. Unrestrained normal weight subjects were expected to show internal regulation.

They found that restrained subjects ate more when anxious but that eating failed to decrease anxiety. This supported earlier findings (McKenna, 1972; Schachter, Goldman, & Gordon, 1968). Herman and Polivy concluded that restrained normal weight subjects behaviorally resembled the obese. Restrained eaters also showed a nonsignificant, though modest, increase in intake as anxiety increased. With reported low anxiety, restrained and unrestrained subjects consumed similar amounts of ice cream. With reported high anxiety, significant differences were seen as restrained subjects increased intake and unrestrained showed a decrease.

Herman and Polivy concluded that degree of deprivation, or body weight below set point, had value in explaining behavioral differences

between obese and normal weight individuals. However, problems with this study included a lack of information about the mood scale used to assess anxiety and a lack of information regarding determination of weight status. Administration of the restraint questionnaire at the conclusion of the experiment may have produced results that interacted with subject anxiety level. Herman and Polivy found that restraint labels significantly predicted behavior for normal weight subjects but since no obese group was included in this study, demonstrated behaviors may not generalize between the groups.

Hibsher and Herman (1977) classified 86 college age men as obese, normal, or skinny to better test the predictive value of restraint theory. These groups were further subdivided as restrained or unrestrained eaters based upon a subjective questionnaire containing the restraint instrument. Another purpose of this study was to locate physiological attributes of the obese. Researchers decided to measure free fatty acid (FFA) level since it is an indicator of physiological condition. In the unfed state, FFA levels are elevated in normal individuals; however, factors such as exercise, stress, mood, and drugs may also cause elevated levels.

Following administration of a milkshake preload, researchers expected to find increased food consumption in restrained (reportedly dieting) individuals because of the override of usual caloric controls. They also predicted that FFA level would be best predicted by level of restraint rather than degree of overweight.

Results were reported indicating that both consumption patterns and FFA levels correlated, as expected, to restraint category rather than weight status. Following a preload, restrained subjects consumed significantly more ice cream than the unrestrained. Unexpectedly, intake following the preload discriminated only between restrained and unrestrained subjects within a weight category and did not demonstrate significant differences among weight categories. Contrary to restraint theory, the group that demonstrated the greatest regulatory behavior was the obese. Ruderman and Wilson (1979) stated that this study

showed that restraint was a better predictor of consumption than weight. However, it did not examine the interaction of weight and restraint, still leaving unresolved the question of whether restraint predicts behavior among obese and normals equally well. (p. 582)

Herman, Polivy, Pliner, Threlkeld, and Munic (1978) measured the response of restrained and unrestrained subjects to distraction in a series of two experiments. Restrained subjects were currently dieting and the unrestrained were not. Since Schachter's externality theory had described the obese as more externally sensitive, these researchers expected a differential response to distraction between restrained and unrestrained subjects. They expected that performance of restrained subjects would decrease with distraction while performance of the unrestrained would increase.

Results from the first experiment showed that, based on restraint labels, subjects responded differently to sources of environmental

arousal in the expected directions. Results from the second experiment replicated the first and showed that indication of high anxiety reversed the pattern for both groups. Researchers hypothesized that changes in anxiety level produced performance pattern changes. They concluded that restrained subjects were more reactive to emotional stimuli, a finding supported by Herman and Polivy (1975).

Polivy, Herman, and Warsh (1978) further studied the emotional component in restrained and unrestrained subjects. They measured the responses of subjects to visual stimuli following ingestion of either a caffeine tablet or placebo. They wanted to determine whether internal or external reactivity or a combination of the two were related to hyperemotionality in restrained subjects. Caffeine was given to half the subjects in each group to evoke a more extreme emotional reaction.

Based on these results, Polivy, Herman, and Walsh indicated that restrained subjects rated emotion-laden visuals as extremely more positive or negative than unrestrained subjects. They found these data agreed with the finding that the restrained were more emotionally reactive. Unexpectedly, those given caffeine showed a decline in extremity of response among restrained subjects while increased extremity of response was demonstrated by the unrestrained. Response differences between groups were significant in the placebo condition. From these results, Herman,

Polivy, and Warsh concluded that emotions were affected by restraint but that the source of emotional reactivity was not identified.

Polivy (1976) studied the cognitive effect of food in restrained and unrestrained subjects. She cited Herman and Polivy (1975); McKenna (1972); and Schachter, Goldman, and Gordon (1968) who postulated behavioral parallels between obese and restrained normal weight subjects. Polivy wanted to measure the cognitive processes involved with conscious reduction of intake. She believed that restrained individuals would have greater cognitive awareness and recall of foods eaten.

For this study, normal weight male subjects were randomly assigned to preload conditions where they were told either true or false information about the caloric content of a preload. They were then given sandwich quarters to consume and differences between groups were compared for intake recall accuracy and total food intake.

Polivy found that unrestrained subjects ate more when they perceived they had eaten a low calorie preload. Restrained subjects who perceived a high calorie preload ate more. Polivy also found significant differences between restrained and unrestrained subjects for accuracy or recall about number of sandwich quarters eaten. Restrained subjects underestimated intake while unrestrained subjects were more accurate.

She concluded that perception of caloric intake affected consumption and resulted in counterregulatory eating for restrained

subjects and regulatory eating for the unrestrained. She believed that counterregulation was in response to perceived rather than actual intake, supporting the notion that cognitive processes rather than internal regulation affected the intake of both normal and overweight subjects. A criticism of Polivy's conclusion was that she did not determine whether subjects believed the instructions given about the caloric content of the preload.

Spencer and Fremouw (1979) replicated Polivy's study to expand the relationship between restraint and perception of calories. They expected unrestrained subjects would exhibit more modified intake than unrestrained according to perceived calorie content of a preload. Four hypotheses were tested. First, restrained subjects were expected to binge after consuming a preload identified as high calorie. Second, restrained subjects given a preload identified as low calorie were expected to eat less than restrained subjects given a high calorie preload. Third, unrestrained subjects were expected to eat less after a perceived high calorie preload and more following a low calorie preload. Fourth, a nonsignificant interaction was expected for Perceived Calories x Actual Weight based on Hibscher and Herman (1977).

Spencer and Fremouw found that restrained subjects exhibited the expected response to perception of caloric content of the preload. Unrestrained subjects showed a trend in the expected direction but the

difference was not significant. As expected, the relationship for Perceived Calories x Actual Weight was not significant. Based on these data, Spencer and Fremouw concluded that restraint, rather than body weight, interacted with cognition to affect food intake. The results supported earlier findings (Herman & Mack, 1975; Hibscher & Herman, 1977; Polivy, 1976) relative to the restraint hypothesis. However, neither Herman and Mack (1975), Hibscher and Herman (1977), nor Polivy (1976) has indicated a prestudy assessment of normal eating habits, food distribution patterns, or daily caloric intake. As oral intake was the independent variable in each study, tighter control of factors affecting intake would have produced more generalizable results. It is not inconceivable that subjects already sensitized to food composition or body weight may have already altered their normal patterns of intake prior to these studies. Alterations such as preexperiment fasting could have an effect on the measured outcomes, especially for restrained individuals. Other noted shortcomings included a lack of reference citation in determining weight status and the low number of obese subjects included for the study. Activity level was not determined nor was body composition. All of these researchers used a between-subjects research design for which there were no baseline data. They also used different populations which resulted in varying median splits and definitions of restrained and unrestrained subjects. The laboratory setting may have intimidated some and produced eating patterns that were

uncharacteristic. Polivy (1976) and Herman and Polivy (1975) used subjective instruments to assess feelings of hunger and mood, respectively. Finally, the term "binge" was used by Spencer and Fremouw (1979) without definition or construct clarification.

With these criticisms in mind, Ruderman and Wilson (1979) studied the influence of restraint on eating patterns and investigated the cognitive component of counterregulation. They hypothesized that restraint, rather than weight, would predict consumption patterns. They believed that restraint would discriminate equally for obese and normal weight subjects. A second hypothesis was that unrestrained subjects would show intake regulation and the restrained would counterregulate due to cognitive perceptions.

Using a modification of the testing procedure outlined by Herman and Mack (1975), Ruderman and Wilson (1979) found results that differed from previous studies. A within-subjects design rather than between-subjects, they showed a significant main effect for restraint. From these results, they concluded that restraint was a good predictor of intake. Between-subjects designs used by earlier restraint researchers had shown the interaction between Preload x Restraint to be significant, leading to the conclusion that preload affected intake. These results indicated that restraint rather than weight was a good predictor of intake. Ruderman and Wilson could not conclude whether restraint predicted behavior equally well for obese and normal weight subjects since baseline data about

consumption were absent. They were able to conclude that counterregulation was most typically demonstrated by restrained normals rather than the obese. Finally, Ruderman and Wilson failed to find a significant effect for cognitive perceptions related to the caloric content of a preload. This may be due to the experimental design since others (Polivy, 1976; Spencer & Fremouw, 1979) have demonstrated a significant cognitive effect.

Because the findings of Ruderman and Wilson (1979) failed to replicate previous restraint research, Ruderman and Christensen (1983) repeated the experiment. Lack of replication had been attributed to the use of a within-subjects repeated measures design. To better test hypotheses, Ruderman and Christensen returned to the previously used between-subjects design and tested three hypotheses. First, they predicted an interaction between restraint and preload would influence consumption. Second, they expected that weight status within the restraint category would result in behavioral differences. Third, weight was expected to show a relationship with intake.

Ruderman and Christensen followed the experimental design outlined by Herman and Mack (1975). Eighty-nine college age females participated in the study. Results showed a significant interaction for Restraint x Preload supporting the belief that restraint scores may predict intake after consuming a preload. Counterregulation was not demonstrated by restrained subjects, a finding in contrast to

Polivy (1976) and Spencer and Fremouw (1979). Ruderman and Christensen reanalyzed raw data from Hibscher and Herman (1977) to investigate conclusions regarding counterregulation. They found that both sets of data indicated binge-style counterregulation as a relative phenomenon in restrained individuals.

A second hypothesis was that weight status within the restraint category would show individual behavioral differences. This interaction was not shown to be significant.

The third hypothesis tested the interaction between weight and intake. Restrained subjects were expected to behave like the obese and exhibit regulatory eating behavior following a preload. At this point, restraint theory was questioned because restrained eaters did not reduce intake while obese subjects showed a reduction. Based on these results, it was concluded that restrained eaters do not parallel the obese, a finding supported by Ruderman and Wilson (1979).

A fourth finding was unexpected. Ruderman and Christensen found that based upon weight status, restrained obese subjects ate less than the unrestrained obese. For those of normal weight, the reverse was true. These results were postulated to be due to a confound between weight and restraint.

Ruderman and Christensen concluded that restraint may predict intake following a preload but that it produced inconclusive results as a model for obesity. They suggested further refinement of the

restraint scale, restraint theory, and associated definitions to improve generalizability.

The role of the restraint questionnaire as a predictive and valid instrument was studied. Drewnowski, Risky, and Desor (1982) evaluated the accuracy of the restraint scale in reflecting individual concern with dieting and influence of concern on self-reported overweight.

They administered the restraint questionnaire to 150 men and women who were almost equally divided by sex and body weight into overweight, average weight, or underweight categories. Using a median split of scores, 76 subjects were labeled as restrained and 74 as unrestrained. According to weight status, restrained subjects comprised 28%, 57%, and 73% of the underweight, average weight, and overweight categories, respectively. These data were consistent with distributions demonstrated by Hibscher and Herman (1977).

The 10 questions on the restraint questionnaire were divided into two categories: diet and weight history and concern with food and eating. Evaluation of reported responses indicated higher scores in both categories for restrained subjects. Self-reported overweight subjects maintained a significantly higher weight history score than self-reported nonoverweight subjects. Restrained overweight subjects also scored higher in this category. Data showed that a high restraint score resulted from concern with dieting and weight status.

Drewnowski, Risky, and Desor (1982) challenged the ability of the restraint questionnaire to discriminate between restraint and degree of overweight since restraint classification was based on the total score. Weight history scores varied with subject weight. Only dietary concern scores remained constant. They concluded that changes were needed before cognitive aspects of food regulation and body weight could be separated.

Blanchard and Frost (1983) also analyzed the usefulness of the restraint questionnaire. Citing the weakness of a lack of psychometric data and use of two unequal subscales to derive a total score, Blanchard and Frost wanted to produce data regarding the factor structure and instrument reliability. They also wanted to investigate the relationship between restraint and three variables: percent overweight, body image, and self-consciousness.

Blanchard and Frost found two unique categories or subscales were represented on the restraint instrument. The first, Concern for Dieting, was related to increased attention to eating and the associated emotions. The second subscale, Weight Fluctuation, indicated weight changes. Weight Fluctuation was measured by four responses and this subscore was confounded by weight status. Thus, restraint data reflected a confound between weight status and weight fluctuation.

An inverse correlation was found between body image and restraint. Restrained individuals indicated a negative body image

resulting from perceived pressure to comply with social expectations. A significant correlation was seen between Public Self-Consciousness and Concern for Dieting, indicating that highly restrained individuals may be affected by social approval. Social Anxiety was significantly correlated with Concern for Dieting, indicating social discomfort when others were present. There was no significant correlation between Restraint and Private Self-Consciousness, indicating that restrained subjects were not less sensitive to internal cues.

Blanchard and Frost concluded that the Concern for Dieting subscale more closely modeled the original restraint hypothesis (Herman & Mack, 1975). They argued against restraint as a response to social pressure based on failure of Public Self-Consciousness and Social Anxiety to interact with Weight Fluctuation. They also indicated a belief that the use of the total restraint score produced inexact information because of the confound between Weight Fluctuation and weight status.

Johnson, Lake, and Mahan (1983) were also concerned about the lack of psychometric data related to the restraint questionnaire. They cited three criticisms of the Restraint Scale. First, ambiguously worded questions were found that may have confused subjects. Second, reliability, validity, and factor structure were not established. Third, generalizability beyond a female, college age population was questioned since this was the group used to test the instrument.

To gather more data about the restraint questionnaire, they studied 136 adult men and women. Each subject completed the Restraint Scale, Lie Scale of the MMPI, and the Crowne-Marlow Social Desirability Scale. Subjects were categorized as obese dieters, obese nondieters, and normals.

Results showed that means for the Lie and Social Desirability scales were about the same for each group. Medians were significantly different among groups for the Restraint Scale with values ranging from 21.07 to 10.84. Obese dieters showed the highest scores. Calculation of psychometric properties revealed variable results in each group.

In conclusion, Johnson, Lake, and Mahan questioned applicability of the Restraint Scale beyond use in a female, college age population. Alpha reliability coefficients different for each adult weight group studied. The restraint construct was not clearly measured by the scale and individual questions were found ambiguous. Beyond a clinical setting, researchers did not recommend use of this instrument.

Lowe (1984) replicated the study of Drewnowski et al. (1982) to investigate the finding that total restraint score was higher in obese subjects due to higher scores on the Diet History subscale and lower scores on the Dietary Concerns subscale. Restraint theorists assumed that obese subjects scored higher on both subscales. Lowe

hypothesized that Total Restraint, Weight History, and Dietary Concern would all correlate with current degree of weight suppression. Lowe also wanted to compare the overweight histories of unrestrained and restrained subjects.

Lowe found significant correlations for Total Restraint, Dietary Concern, and Weight History with weight suppression and concluded that measurement of restraint should include Dietary Concern and Weight Fluctuation. Restrained subjects had a significantly longer weight history than the unrestrained.

In summary, the restraint literature is long and research results confusing. Determination of the psychometric properties of the instrument revealed a confound between weight status of the participant and weight fluctuation. The Restraint Scale is composed of two subscales, Concern for Dieting and Weight Fluctuation. Due to the confound, heavier subjects reported a higher score on the Scale and were labeled as restrained on the basis of weight rather than the restraint construct. The restraint construct has, therefore, been questioned and usefulness of the Scale has not been recommended beyond a clinical research setting.

Self-esteem

No new psychological theory of obesity has been proposed since the decline in popularity of restraint theory. The construct of self-esteem has not been studied extensively in relation to weight

control. However, investigation of self-esteem has revealed relationships to performance, success, anxiety, and behavior. Since weight control is also related to these factors, self-esteem may be an important variable in successful weight management.

Chrzanowski (1981) wrote that as an individual developed, a basically consistent self-image emerged to help cope with life situations. He referred to

a self-reflecting, individual monitoring system pertaining to feelings of personal worth. This ever-present mirror of oneself carries the terms self-esteem, self-regard, self-respect, or similar names. In the broadest sense, self-esteem is a validly favorable image of oneself based on a fair evaluation of one's assets and liabilities. Included in the self-esteem is a feeling of personal dignity, personal merit, and an appreciation of some of the basic human stuff one is made of. Combined with it is an in-touchness with feelings of integrity, acceptability, and mastery. Last, but not least, is the capacity to be aware of one's personal needs and the freedom to gain appropriate satisfactions. (p. 40)

Chrzanowski believed that aspects of self-esteem were central components of an individual to which intelligence, disposition, appearance, and body structure were added. Environmental variables, daily situations, culture, society, and family were viewed as influences that molded it. Self-esteem was defined as a fluid element that may be influenced by changes in environment, interactions with others, and private and professional concerns.

Briggs (1970) wrote that strong self-esteem was based on two convictions. The first was that each person is lovable and has value

because they exist. The second conviction was that each person is worthwhile.

Coopersmith (1986) defined three features of self-esteem. First, he wrote that self-esteem was individually defined with a long range perspective in time rather than a short range view of transitory fluctuations. He found that self-esteem was constant across several years of measurement. Second, Coopersmith believed that the global construct of self-esteem did not vary across individual areas of strength or weakness. For example, one may perceive great self-worth as an athlete but little self-worth as a musician. Third, Coopersmith regarded the self-evaluation component of self-esteem as a judgmental process that enabled individuals to determine self-worth. He wrote that attitudes toward the self were associated with intellectual and motivational processes and that these attitudes occurred either consciously or unconsciously. Therefore, one's perception of self-esteem could proceed unintentionally in the form of posture, speech, or performance.

Kawash (1982) criticized the self-esteem literature because there was no effort to integrate systematically this construct into the personality sphere. He claimed that most researchers investigated only a few self-esteem correlates. Kawash studied the relationship between self-esteem and other personality traits in an attempt to better understand self-esteem structure and dynamics.

Administration of the 16 Personality Factor Questionnaire (16PF) and Coopersmith Self-esteem Inventory (SEI) to undergraduate females revealed three traits with significant correlations to self-esteem: ego strength, parasympathetic immunity to threat-vs.-threat sensitivity, and guilt proneness. Ego strength measured emotional maturity, stability, and orientation toward life. Parasympathetic immunity to threat revealed sociability, degree of social inhibitions, and degree of spontaneity. Guilt proneness reflected security and placidness.

Kawash concluded that high self-esteem was composed of high emotional maturity, stability, a positive outlook on life, sociability, an outgoing nature, confidence, spontaneity, security, and a lack of undue worrying. He compared his results to Maslow's view of the self-actualized person.

An instrument used to identify factors related to self-perception was Rotter's I-E Scale. Dixon and Elias (1979) found that undergraduate students defined an "ideal" person as one with traits related to an internal locus of control. Regardless of their personal orientation toward life, students viewed "ideal" people as those who had control over life's events. This attitude of control has been systematically used to define those with an internal orientation.

Clayson and Frost (1984) noted that locus of control affected perception of self and the environment. They administered the I-E

Scale, Holmes and Rahe's Stress Scale, and a Lawson's Modified Semantic Differential Self-Concept Scale. They found that internally oriented subjects with low stress had a higher mean self-concept. Clayson and Frost concluded that an internal locus and low stress were related to increased self-esteem, self-liking, marital satisfaction, and a conservative orientation toward life.

Fish and Karabenick (1971) also used Rotter's I-E Scale to study self-esteem. With results from the I-E Scale and the Janis and Field Feelings of Inadequacy Scale, they found a relationship between positive self-esteem and an internal locus of control. These results compared favorably with those of Ryckman and Cannon (1975).

Generally, how one feels about oneself has been related to feelings about one's body, although the relationship between self-esteem and body-esteem has not been well researched. Mendelson and White (1982) defined body-esteem as the affective component of body image and developed the Body-Esteem Scale to measure this construct. They investigated the effect of body-esteem on self-esteem in groups of overweight and normal weight children. Self-esteem was measured by the Piers-Harris Children's Self-Concept Scale. Mendelson and White found that a significant relationship existed between body-esteem and self-esteem. When attempting to predict body-esteem from age, sex, weight status, and self-esteem, they found that only weight status and self-esteem contributed a significant proportion of

the variance. Multiple R^2 for body-esteem and self-esteem was .47 and .61 for body-esteem and weight status. These findings with children may be related to self-esteem relationships in adults.

Jacobs and Wagner (1984) found that obese subjects reported a lower physical self-concept than normal weight or previously overweight subjects. The construct "physical self-concept" refers to self-opinion relative to body image, physical health, physical appearance, and sexual functioning.

Pearlson, Flournoy, Simonson, and Slavney (1981) measured relationships among body image, age of obesity onset, and weight loss success. They defined body image as perception of body width in different areas and attitudes regarding these body widths. They failed to demonstrate any significant relationships among body image, age of obesity onset, and weight loss success.

Owusu-Bempah and Howitt (1983) examined weight loss patterns for individuals in a weight reduction program that measured not only cognitions about obesity but also body image. They found that successful weight loss resulted from both behavioral management and cognitive awareness of body image.

Psychological Type

Although many personality factors have been studied for relationships to weight control, these factors generally have been associated with abnormal personalities. Psychological instruments

such as the MMPI have been used to diagnose pathological personalities. However, inspection of the obese population reveals that most do not suffer from abnormal personality disorders. The Myers-Briggs Type Indicator (MBTI) was developed for use with normal populations and has promise as an indicator of personality differences in the obese.

One can infer from the theory underlying the MBTI that psychological type may be useful in predicting those personality preferences most likely to achieve successful weight control. For clinicians, type data may enable analysis of instructional methods and materials according to the needs of clients. They may also enable clinicians to better motivate the obese to gain control of both learning and their environment by tailoring instruction to meet their learning styles.

The MBTI was developed by Isabel Briggs Myers and Katharine Briggs to apply the theory of psychological types developed by Carl Jung. Jung's theory was based on the idea that

much seemingly random variation in behavior is actually orderly and consistent, being due to basic differences in the way individuals prefer to use their perception and judgment. Perception involves all of the ways of becoming aware of things, people, happenings, or ideas. Judgment involves all of the ways of coming to conclusions about what has been perceived. (Myers & McCaulley, 1985, p. 1)

Type theory is distinctive in that it postulates dichotomies between four preferences: extraversion-introversion (EI),

sensing-intuition (SN), thinking-feeling (TF), and judgment-perception (JP). According to the theory, one's preferences in these four dimensions results in 16 possible combinations or types. Types are indicated by letters, for example, ENFJ.

Explanation of the preferences identified by type theory follows: Extraversion-Introversion characterizes orientation toward life. In the extraverted attitude, attention is drawn either consciously or unconsciously to people and objects in the external environment. Extraverted individuals are action-oriented, sociable, and dependent on the environment for stimulation. In the introverted attitude, attention is either consciously or unconsciously drawn to the internal environment of ideas and concepts. Individuals are thoughtful and contemplative with social detachment and a value for privacy.

Sensing-Intuition refers to processes involved with the flow of events when not constrained by rational direction. Sensing perception uses the senses to establish what exists. Since the senses are oriented toward present conditions, sensing individuals are cognizant of immediate experiences. They tend to be practical, realistic, detail-oriented, and keen observers of their environment. Intuitive perception uses insight to explore possibilities, meanings, and relationships. Intuitive individuals tend to be future-oriented and may overlook current conditions. They also tend toward the abstract, theoretical, imaginative, and creative.

Thinking-Feeling refers to judging activities used to bring life into order with laws of reason. Thinking judgment uses logic to establish relationships and links between ideas. It is impersonal. Individuals preferring thinking judgment are characterized by objectivity, analytical reasoning ability, critical thinking, toughmindedness, and a time orientation from past through the present to the future. Feeling judgment weighs the relative merit of situations and is subjective since it depends on understanding the values of self and others. Individuals preferring feeling judgment tend to be more aware of others, more concerned with the human element in problem situations, and more tender-minded. They are desirous of harmonious relationships and have a time orientation to preserving the values of the past.

Judgment-Perception refers to attitudes and behaviors toward the external environment. This preference shows how individuals deal with the environment or extraverted world. Those with a perceiving attitude focus on incoming information and tend to be open-minded, spontaneous, and curious. Those with a judging attitude focus on decision-making, coming to closure, planning and organizing activities, and resolution of questions and problems.

Hildebrandt (1982) used the MBTI to analyze cognitive style and obesity. She found that of the 44 subjects studied, no differences in weight reduction were found between groups for sex or marital status.

Differences were found for education level that may have been related to socioeconomic group. In the TF scale, preference strength, rather than the preference itself, was related to weight loss ability.

Harris (1985) tested many type combinations to find those with correlates to obesity. He found that psychological type could not be used to predict obesity and concluded that lifestyle choices did not cause problems, rather, the intensity of those choices resulted in obesity.

Livingston (1971) studied the relationship between self-concept and psychological type using the Osgood Semantic Differential Technique and the MBTI. He found that directional tendencies for relationships existed between positive self-concept and intuitive perception (N), feeling judgment (F), and intuitive perception with feeling judgment (NF).

Research of psychological type has also resulted in important information related to education. This information is relevant to differences found in the obese in learning situations.

Isaac (1975) wrote that frequently a cancellation of effects occurs in the research of learning theory. To avoid this aptitude-treatment interaction (ATI), he advocated measurement of type interactions with treatment. In the learning environment, Isaac postulated that sensing types were extrinsically motivated while intuitive types were intrinsically motivated. Sensing individuals

were hypothesized as those aware of concrete penalties and rewards and responsive to them as the "means to an end." Intuitive individuals were described as those interested in the self-fulfillment of experiences.

Bargar and Hoover (1983) investigated the behavioral implications of psychological type. They found that for teaching and learning, type preference affected both learner and instructor. Each preferred to learn and teach according to individual psychological type. Therefore, "student achievement and teacher performance are most likely maximized when type and subject are matched" (p. 24).

Lawrence (1984) analyzed previous findings of the differential learning preferences of students based on psychological type. In the Judging-Perceiving preference, differences were seen in cognitive style. Those with a judging preference preferred an orderly, systematic, and traditional approach to learning while those with a perceiving preference preferred more open exploration of the subject. When learners were mismatched for psychological type and learning situation, frustration and drop-out resulted.

Individual type preferences of the MBTI have been correlated with other psychological instruments. Correlations between the MBTI continuous scores and other scales of personality measures were summarized by Myers and McCaulley (1985). Of those instruments listed, six yielded measures that may contribute to successful weight control. These are listed below.

Correlations between the Adjective Check List and MBTI were significant between self-confidence and EN, self-control and SJ, personal adjustment and FJ, and endurance and STJ. The California Psychological Inventory (CPI) was correlated self-acceptance and EN, sense of well-being and E, responsibility and J, self-control and J, and achievement via independence and J. The Comrey Personality Scales indicated a correlation between orderliness versus lack of compulsion and STJ. Research involving the MBTI and the Edwards Personality Preference Survey (EPPS) ranked only scores for males. Results showed correlations between achievement and T, autonomy and NTP, and endurance and TJ. The Stein Self-Description Questionnaire revealed correlations between achievement and J for men and autonomy and I for men, NP for women. Finally, the 16 Personality Factor (16PF) Questionnaire was correlated through high ego strength and E and high self-concept and J.

Theoretical Framework for Hypothesis Development

The present research was designed to answer four questions. The first question developed was designed to explore the relationship between differences in psychological type preferences and the maintenance of weight loss. The second was postulated to examine the influence of self-esteem on weight maintenance. The third question was proposed to investigate the interaction among psychological type preferences, self-esteem, and group membership as a maintainer, program participant, or nonparticipant. The

purpose of the fourth question was to predict those variables associated with group membership.

To answer the first research question, two hypotheses were developed from the literature review. Hypothesis one was based on Harris (1985) who found that psychological type could not be used to predict obesity. Therefore, it was expected that the study sample would be heterogeneous with respect to psychological type distribution.

The second hypothesis was based on a summary of the research about the relationship between psychological type and individual personality measures that may enable maintenance of a weight loss. The first part of this hypothesis evaluated the preference for either Extraversion or Introversion. In the literature review, it was found that Extraversion correlated highly with both sense of well-being on the California Psychological Inventory and with high ego strength on the 16 Personality Factor Questionnaire. So, it was expected that there would be a greater preference for Extraversion to Introversion in the maintainer group. The next part of this hypothesis examined preferences for either Sensing or Intuition. To formulate this part of the hypothesis several research findings were included. To begin with, type theory researchers have predicted that Intuitive perception is future-oriented while Sensing perception is oriented to the present. Isaac (1975) found that sensing types were extrinsically motivated while intuitive types were intrinsically motivated. And, researchers correlating the MBTI preferences with other

psychological instruments have found that Extraversion-Intuition correlated with self-confidence on the Adjective Check List and with self-acceptance on the California Psychological Inventory. Therefore, it was predicted that the frequency of those subjects preferring Intuitive perception to those preferring Sensing perception would be greater in the maintainer group. The third part of this second hypothesis concerned differences between preferences for Judgment or Perception. The literature showed that preferences for Judgment correlated with responsibility, self-control, and achievement via independence on the California Psychological Inventory; with achievement in men on the Stein Self-Description Questionnaire; and with high self-concept on the 16 Personality Factor Questionnaire. Therefore, it was expected that there would be more in the maintainer group preferring Judgment to Perception. The last part of the second hypothesis was based on the findings of Livingston (1971), who found a relationship between positive self-concept and Intuitive perception with Feeling judgment. So, it was expected that a higher proportion of Intuitive-Feeling types would be found in the maintainer group.

Preferences for Thinking or Feeling were measured in a separate hypothesis. Hypothesis five was based on Hildebrandt (1982) who found that a strong preference for either Thinking or Feeling was useful in predicting those who would be able to lose weight. Therefore, it was expected that stronger preferences would be found in the maintainer group.

The second research question was proposed to examine the relationship between self-esteem and maintainance of a weight loss. It was expected that the mean self-esteem score, as measured by the Coopersmith Self-Esteem Inventory (SEI), would be greater in the maintainer group, followed by the program participant group, and then the nonparticipant group.

The third research question was proposed to examine the relationship among psychological type preference, self-esteem, and group membership. To answer this question, hypothesis four was based on Kawash (1982) who found that high self-esteem included sociability and an outgoing nature. Therefore, it was predicted that the maintainer group would show a stronger relationship between Extraversion and self-esteem than the other groups.

The fourth research question was proposed to examine the relationship among psychological type, self-esteem, and weight history variables to predict group membership. Based on the literature review, it was expected that group membership would be best predicted by Extraversion, total self-esteem score, age of obesity onset, amount of social support, weekly exercise frequency, and parental weight history.

Summary of Related Research and Implications for This Study

Despite the interest in weight control, there appear to be few predictors of successful weight loss and maintenance. There has been a lack of statistical rigor and design standardization between studies of obesity. A lack of uniform research methods and obesity-related criteria have further hindered the identification process by preventing comparison of results among studies.

The research of weight maintenance based on psychological theories has failed to demonstrate construct validity. Theories have appeared in the literature as discrete theoretical proposals with definitions that borrow concepts from earlier theories that have not demonstrated validity.

It is believed that personality factors do contribute to weight control. Once these factors have been identified, a pretreatment assessment may indicate specific areas of needed development in obese individuals. Instruction in these areas may then be targeted according to need.

The purpose of instruction is twofold. First, one must identify the knowledge base of each participant so that instruction may systematically add to what is known. Second, instruction may be tailored both to areas of individual deficiency for remediation and areas of strength for reinforcement. Without knowledge of the variables related to weight maintenance, effective instruction cannot proceed.

The purpose of this study was to examine whether assessment for self-esteem and psychological type differences and weight history variables may provide health educators with information that could be useful relative to subject motivation patterns, weaknesses, and learning style. The goal was to heighten awareness in health educators about the individual differences in those that they teach.

CHAPTER III PROCEDURES AND METHODS OF ANALYSIS

Site and Sample

The subjects of the study were 68 adult volunteers contacted through one of these organizations: Weight Watchers International, the North Florida Regional Medical Hospital Wellness Center, the Alachua General Hospital Center for Health and Fitness, Living Faith Fellowship, and Williston Memorial Hospital. Most lived in Gainesville, Florida, others in the surrounding rural towns. All were or had previously been overweight.

Instrumentation

The Personal Weight History Questionnaire was designed by the researcher to obtain participant self-report data: weight, height, exercise frequency, exercise intensity and type, age of obesity onset, dieting history, and situations related to eating. Other information included age, sex, level of education, family weight history, social support system, marital status, and employment. (See Appendix A.) For those at ideal weight, three additional questions were included: length of time ideal weight had been maintained, type of program that resulted in present success, and identification of the program

component that facilitated success. The basis for content validity of the questionnaire was the literature review.

There was no randomization effort made and the independent variable, weight status, was not manipulated. Because age, sex, race, education level, socioeconomic group, marital status, and religious affiliation were not shown in the literature review to be predictive of weight status, no effort was made to control for these variables. Weight history, physical exercise, and age of obesity onset had demonstrated a relationship to weight status. All of these variables were measured by the Personal Weight History Questionnaire.

The second instrument was the Myers-Briggs Type Indicator (MBTI), Form G. MBTI split-half correlations, corrected by the Spearman-Brown prophecy formula, yielded coefficients ranging from .57 to .95 on the various scales for Form G (Myers & McCaulley, 1985). Myers and McCaulley (1985) indicated that reliability estimates are dependent upon characteristics of the responding subjects. Reliability will be affected by the statistical methods used and by the respondent's intelligence, self-understanding, and self-judgment. Those with good self-perception are more aware of their preferences, a factor that increases reliability. Higher levels of achievement are also positively related to consistent responses. Age is found to be a factor as older subjects are more consistent in their preferences than are younger. All of the subjects in this study were within the age and education parameters intended for reliable MBTI use.

Validity of the MBTI was determined by evidence of relationships and predicted outcomes according to type theory. Validity was supported by positive correlations between the MBTI and other instruments including the Edwards Personal Preference Survey, Strong-Campbell Interest Inventory, 16 Personality Factor Questionnaire, and Adjective Check List. Correlations were significant and moderately high (Myers & McCaulley, 1985; Sewell, 1985).

The third instrument, the Coopersmith Self-Esteem Inventory (SEI) was used to measure a person's usual sense of self-evaluation. Reliability was determined, and internal consistency coefficients using KR20 ranged from .87 to .92 for the fourth through the eighth grade. Concurrent validity was established with correlations between the SEI and achievement and intelligence tests (Coopersmith, 1986). For research purposes, Peterson and Austin (1985) have agreed that the SEI has applicability.

Design and Analysis

This research study was ex post facto with a counterbalanced quasiexperimental design. Each hypothesis was considered separately and, for that reason, a variety of statistical methods was used.

For hypotheses one and two, chi square was used to compare the frequencies of psychological type preferences between the study group and a reference group. The independent variable was group membership

and the dependent variable was psychological type preferences. Hypothesis three was tested by orthogonal planned comparisons among the three groups with mean self-esteem score as the dependent variable. Hypothesis four was tested by point biserial correlations. Hypothesis five used orthogonal planned comparisons to locate differences between the groups based on strength of preference for either Thinking or Feeling. Finally, a post hoc analysis using a regression model was used to predict those variables associated with successful weight maintenance as the test of hypothesis six. In this hypothesis group membership was the dependent variable. All hypotheses were tested at $\alpha = .05$.

Data Collection

Subjects were assigned to three categories for purposes of data analysis: maintainers, program participants, and nonparticipants. Maintainers were defined as those who had maintained weight in the ideal range for a minimum of one year, but whose weight had previously exceeded 20% of the midpoint of the ideal weight range for those with a medium frame. The weight reference used was the 1983 Metropolitan Life Insurance Tables (Burton, Foster, Hirsch, & VanItallie, 1985). Program participants were those who were currently involved with weight loss efforts and were not currently maintaining weight in the ideal range. Nonparticipants were obese subjects who were currently not involved in attempts to lose weight. There were 13 maintainers, 35 program participants, and 20 nonparticipants.

Volunteers were given a materials packet containing a cover letter and general instructions for completing the test instruments. The cover letter and general instructions are found in Appendices B and C, respectively. Since the instruments were self-administering, participants were asked to complete them at home within a one-week time period. Upon completion of the instruments, participants returned materials to a designated drop site that differed for each group surveyed. MBTI results were returned to all participants with information about each person's individual psychological type. Application of type theory was explained in more detail to participants who indicated interest.

Hypotheses

Based on the literature review of psychological type, self-esteem, and weight history variables, it was expected that

1. The obese are a heterogeneous group.
2. Analysis of single dimensions of type would show greater frequencies of members in the maintainer group, followed by the program participant group, and then the nonparticipant group with the following preferences:

Extraversion > Introversion

Intuitive > Sensing

Judgment > Perception

Intuitive-Feeling > Intuitive-Thinking

3. A higher mean self-esteem score would be found for maintainers, followed by program participants, and then nonparticipants.

4. A point biserial correlation between Extraversion and self-esteem would be higher in the maintainer group than in the other groups.

5. Stronger preferences for either Thinking or Feeling would be found in the maintainer group than the program participant group, followed by the nonparticipant group.

6. Group membership would be best predicted by age of obesity onset, amount of social support, weekly exercise frequency, parental weight history, total self-esteem score, and Extraversion.

CHAPTER IV RESULTS

The purpose of this research was to measure the relationships among psychological type, self-esteem, and weight history variables and maintenance of weight loss. The resulting data are organized by the stated research hypotheses. A demographic overview of each group participating in this study is presented in Tables 4-1, 4-2, and 4-3.

Sample Demographics: Summary of Results

A comparison of the three groups revealed approximately equal percentages of male and female participants. The maintainers, program participants, and nonparticipants were 15, 35, and 15% and 85, 65, and 85% male and female, respectively.

The age distribution was also similar for the three groups. The notable difference was seen in the program participant group for the 60+ age category. Of the participants, 23% were 60 years or older as compared to only 8% from the maintainer group and 10% from the nonparticipant group.

Level of education showed patterns that differed for the three groups. Of the nonparticipants, 15% did not have a high school diploma compared to 3% of the program participants and 0% of the maintainers. The program participants reported 12 years of education

Table 4-1

Variable Distribution for Entire Group (N=68)

Variable	Maintainers	Program Participants	Nonparticipants
<u>Sex</u>			
Male	2 (15)	8 (35)	3 (15)
Female	11 (85)	27 (65)	17 (85)
<u>Age</u>			
18-29 years	2 (15)	3 (9)	2 (10)
30-39 years	4 (31)	7 (20)	8 (40)
40-49 years	3 (23)	11 (31)	6 (30)
50-59 years	3 (23)	6 (17)	2 (10)
60+ years	1 (8)	8 (23)	2 (10)
<u>Education</u>			
Less than 12 years	0 (0)	1 (3)	3 (15)
High school diploma	3 (23)	16 (46)	7 (35)
1-3 years college	6 (46)	8 (23)	6 (30)
Bachelor's degree	3 (23)	4 (11)	3 (15)
Master's degree	0 (0)	6 (17)	1 (5)
Doctoral degree	1 (8)	0 (0)	0 (0)
<u>Marital Status</u>			
Single	1 (7.5)	4 (11)	3 (15)
Married	11 (85)	27 (77)	11 (55)
Separated	1 (7.5)	1 (3)	0 (0)
Divorced	0 (0)	2 (6)	4 (20)
Widowed	0 (0)	1 (3)	2 (10)

Note: Percentage of subjects shown in parentheses.

Table 4-2

Comparison by Self-Esteem Score

Variable	Maintainers	Program Participants	Nonparticipants
<u>Total Score</u>			
High Self-Esteem	10 (77)	14 (45)	5 (25)
Medium Self-Esteem	2 (15)	17 (50)	14 (70)
Low Self-Esteem	1 (8)	1 (5)	1 (5)

Note: Percentage of subjects shown in parentheses.

in frequencies twice as large as the other groups. Maintainers had more college experience and bachelor's degrees than subjects in the other groups. Advanced degrees were obtained by subjects in each category.

Marital status showed differences among the groups. Especially notable were the differences among groups in the married category. Maintainers, program participants, and nonparticipants indicated that 85, 77, and 55%, respectively, were married. In the same order of comparison, 0, 6, and 20% of the members of the respective categories were divorced.

Shown in Table 4-2 is the number of subjects within each group for high, medium, and low self-esteem. Scores showed distinct differences among the groups when compared as percent of subjects

Table 4-3

Comparison by Psychological Type

Variable	Maintainers	Program Participants	Nonparticipants
ESTJ	2 (15.4)	5 (14.3)	2 (10.0)
ESTP	2 (15.4)	1 (2.9)	1 (5.0)
ESFJ	2 (15.4)	7 (20.0)	1 (5.0)
ESFP	0	1 (2.9)	4 (20.0)
ENTJ	0	0	0
ENTP	0	0	0
ENFJ	0	1 (2.9)	1 (5.0)
ENFP	1 (7.7)	0	0
ISTJ	0	5 (14.3)	1 (5.0)
ISTP	0	0	1 (5.0)
ISFJ	2 (15.4)	7 (20.0)	6 (30.0)
ISFP	2 (15.4)	3 (8.6)	0
INTJ	0	2 (5.7)	1 (5.0)
INTP	0	1 (2.9)	0
INFJ	2 (15.4)	1 (2.9)	0
INFP	0	1 (2.9)	2 (10.0)

Note: Numbers in parentheses indicate the percent of subjects in each group.

who achieved a score of high, medium, and low self-esteem. The percent of maintainers with high self-esteem was greater than that of the program participants followed by nonparticipants. Inversely, the percent of medium self-esteem scores was largest in the nonparticipants, followed by the percent in the program participants and then the maintainers. Differences were not found among the groups for the percent of subjects with low self-esteem since one member from each group was found in this category.

A type comparison of subjects within each group is found in Table 4-3. Typically, MBTI results are described using Selection Ratio Type Tables (SRTT). The SRTT is a computer program developed for researching and comparing type distributions. An additional benefit of SRTT is that it provides a consistent method of displaying research results, thus making it possible to make meaningful comparisons.

Using SRTT, Table 4-4 displays the type distribution of the total study sample in comparison to a reference population from MBTI research that reflects the probable type distribution in the United States. As noted in Table 4-4, the reference group is 2514 freshmen entering the University of Florida in 1972. Since all of the participants in the present study had been or were obese, Table 4-4 allows a comparison of type distributions between an obese and a presumed normal population.

Table 4-4

MBTI Type Distribution for Total Group

GROUP
TABULATED:
Total Guyer Sample

N= 68

MBTI TYPE TABLE
CENTER FOR APPLICATIONS
OF PSYCHOLOGICAL TYPE

LEGEND: % = PERCENT OF
TOTAL CHOOSING THIS GROUP
WHO FALL INTO THIS TYPE.
I = SELFSELECTION INDEX;
RATIO OF PERCENT OF TYPE
IN GROUP TO % IN SAMPLE.

SENSING TYPES WITH THINKING		INTUITIVE TYPES WITH FEELING			N	%	I
ISTJ	ISFJ	INFJ	INTJ				
N= 6	N= 15	N= 3	N= 3	J U D G I N G I N T R O V E R T S P E R C E P T I V E S E X T R A V E R T S J U D G I N G	E	31 45.59	.85
%= 8.82	%=22.06	%= 4.41	%= 4.41		I	37 54.41	1.18
I= 1.39	I= 3.30*	I= .98	I= 1.08		S	55 80.88	1.78*
					N	13 19.12	.35*
					T	24 35.29	.94
					F	44 64.71	1.04
					J	48 70.59	1.46*
					P	20 29.41	.57*
					IJ	27 39.71	1.83*
					IP	10 14.71	.60
					EP	10 14.71	.55*
					EJ	21 30.88	1.15
					ST	20 29.41	1.52*
					SF	35 51.47	1.97*
					NF	9 13.24	.37*
					NT	4 5.88	.32*
					SJ	40 58.82	2.03*
					SP	15 22.06	1.34
					NP	5 7.35	.21*
					NJ	8 11.76	.60
					TJ	18 26.47	1.18
					TP	6 8.82	.57
					FP	14 20.59	.57*
					FJ	30 44.12	1.69*
					IN	10 14.71	.59
					EN	3 4.41	.15*
					IS	27 39.71	1.85*
					ES	28 41.18	1.72*

NOTE CONCERNING SYMBOLS FOLLOWING THE SELECTION RATIOS:

* IMPLIES SIGNIFICANCE AT THE .05 LEVEL, I.E., CHI SQ. > 3.8;

* IMPLIES SIGNIFICANCE AT THE .01 LEVEL, I.E., CHI SQ. > 6.6;

* IMPLIES SIGNIFICANCE AT THE .001 LEVEL, I.E., CHI SQ. > 10.8.

(UNDERScore) INDICATES FISHER'S EXACT PROBABILITY USED INSTEAD OF CHI-SQUARE.

BASE POPULATION USED IN CALCULATING SELECTION RATIO:
University of Florida Freshman Entering 1972, MBTI ATLAS
BASE TOTAL N = 2514. SAMPLE AND BASE ARE INDEPENDENT.

*** CALCULATED VALUES OF CHI SQUARE OR FISHER'S EXACT PROBABILITY ***

TYPE TABLE ORDER							
				E	1.77	IJ	12.55
				I	1.77	IP	3.53
				S	33.47	EP	5.07
				N	33.47	EJ	.56
				ST	4.27	TJ	.64
				SF	21.75	TP	2.19
				F	.16	NF	15.23
				J	12.99	NT	.00
				P	12.99	FP	7.02
						FJ	11.02
.67	23.77	1.00	1.00			IN	3.61
						EN	.00
.53	.58	.11	.26			IS	12.75
						ES	10.72
.07	.59	.00	.08				
3.00	3.43	.32	.12				

A comparison of single dimensions of type revealed that significantly more of those in the study group preferred Sensing and Judgment than would be predicted from the reference group. Similarly, there were significantly fewer than would be expected with preferences for Intuition and Perception. Myers and McCalley (1985) found that, in the United States population, it is expected that 75% of the people will prefer Extraversion (E) and 25% Introversion (I). In this sample, 46% were E's and 54% I's. The U.S. population is estimated to consist of 25% who will prefer Intuition (N) and 75% who will prefer Sensing (S). This study group was 19% N's and 81% S's. Myers and McCaulley estimated that 65% of the females in the United States prefer Feeling (F) and 60% of the males prefer Thinking (T). A preference for Judging (J) is found in 55-60% of the U.S. population, with the remaining individuals preferring Perception (P). This study group was 65% F's and 35% T's and consisted of 81% females. It was also 71% J's and 29% P's.

Comparisons by type revealed that the modal type for the study group was ISFJ. Typically, in the U.S. population 4.48-9.46% are expected to be identified as ISFJ (Myers & McCaulley, 1985). In this group, 22.06% were identified as ISFJ.

Hypotheses One and Two

The first two hypotheses were concerned with testing the differences in psychological type preferences among the maintainer, program participant, and nonparticipant groups to a reference group.

Hypotheses one and two were tested with chi square analysis. The first hypothesis was that the sample would be heterogeneous with respect to psychological type distribution. To test this hypothesis, the entire sample was compared to a reference group. It was found that the sample was heterogeneous and Table 4-4 shows that only one type, ISFJ, was found in greater frequency than expected.

The second hypothesis predicted that the frequency of preferences for single dimensions of type would differ within the maintainer, program participant, and nonparticipant groups. Specifically, from the literature review it was expected that there would be more preferring Extraversion than Introversiion, Intuition than Sensing, Judgment than Perception, and Intuition-Feeling than Intuition-Thinking in the maintainer, program participant, and nonparticipant groups, respectively. To test this hypothesis, the frequency of type preferences within each group was compared to that of the entire group. The results are found in Tables 4-5, 4-6, and 4-7. Data from Tables 4-5 and 4-6 show no significant differences in the frequency of type distributions between the maintainer and program participant groups and the composite group. Data for Table 4-7 shows a greater frequency of Extraverted-Sensing-Feeling-Perceptives (ESFP's) in the nonparticipants than in the composite group.

Table 4-5

MBTI Type Distribution for Maintainer Group

GROUP
TABULATED:
Maintainers

N= 13

MBTI TYPE TABLE
CENTER FOR APPLICATIONS
OF PSYCHOLOGICAL TYPE

LEGEND: % = PERCENT OF
TOTAL CHOOSING THIS GROUP
WHO FALL INTO THIS TYPE.
I = SELF-SELECTION INDEX:
RATIO OF PERCENT OF TYPE
IN GROUP TO % IN SAMPLE.

SENSING TYPES		INTUITIVE TYPES				N	%	I
WITH THINKING	WITH FEELING	WITH FEELING	WITH THINKING					
I S T J	I S F J	I N F J	I N T J	J U D G I N G	E I	7	53.85	1.18
N= 0	N= 2	N= 2	N= 0		S N	10	76.92	.95
%= 0.00	%=15.38	%=15.38	%= 0.00		T F	4	30.77	.87
I= 0.00	I= .70	I= 3.49	I= 0.00		J P	9	69.23	1.07
I S T P	I S F P	I N F P	I N T P	I N T R O V E R T S	I J	8	61.54	.87
N= 0	N= 2	N= 0	N= 0		I P	5	38.46	1.31
%= 0.00	%=15.38	%= 0.00	%= 0.00		EP	4	30.77	.77
I= 0.00	I= 2.09	I= 0.00	I= 0.00		EJ	2	15.38	1.05
E S T P	E S F P	E N F P	E N T P	P E R C E P T I V E S	ST	3	23.08	1.57
N= 2	N= 0	N= 1	N= 0		SF	4	30.77	1.00
%=15.38	%= 0.00	%= 7.69	%= 0.00		NP	4	30.77	1.05
I= 2.62	I= 0.00	I= 5.23	I= 0.00		NF	6	46.15	.90
E S T J	E S F J	E N F J	E N T J	E X T R A V E R S E S	NT	3	23.08	1.74
N= 2	N= 2	N= 0	N= 0		SJ	0	0.00	0.00
%=15.38	%=15.38	%= 0.00	%= 0.00		SP	6	46.15	.78
I= 1.16	I= 1.05	I= 0.00	I= 0.00		NP	4	30.77	1.39
				J U D G I N G	NJ	1	7.69	1.05
					TJ	2	15.38	1.31
					TP	2	15.38	.58
					FP	2	15.38	1.74
				J U D G I N G	FJ	3	23.08	1.12
					EN	6	46.15	1.05
					IN	2	15.38	1.05
					ES	1	7.69	1.74
					IS	4	30.77	.77
					ES	6	46.15	1.12

NOTE CONCERNING SYMBOLS FOLLOWING THE SELECTION RATIOS:

* IMPLIES SIGNIFICANCE AT THE .05 LEVEL, I.E., CHI SQ. > 3.8;

* IMPLIES SIGNIFICANCE AT THE .01 LEVEL, I.E., CHI SQ. > 6.6;

* IMPLIES SIGNIFICANCE AT THE .001 LEVEL, I.E., CHI SQ. > 10.8.

(UNDERSCORE) INDICATES FISHER'S EXACT PROBABILITY USED INSTEAD OF CHI-SQUARE.

BASE POPULATION USED IN CALCULATING SELECTION RATIO:

Total Guyer Sample

BASE TOTAL N = 68. SAMPLE AND BASE ARE DEPENDENT.

*** CALCULATED VALUES OF CHI SQUARE OR FISHER'S EXACT PROBABILITY ***

TYPE TABLE ORDER							
.34	.72	.09	.61	E	.44	IJ	.54
1.00	.24	.61	1.00	I	.44	IP	1.00
.16	.57	.19	*****	S	.70	EP	.39
1.00	1.00	1.00	*****	N	.70	EJ	1.00
						NJ	1.00
				T	.76	ST	1.00
				F	.76	SF	.18
				J	.50	NF	.36
				P	.50	NT	.58
						TJ	.49
						TP	.59
						FP	1.00
						FJ	.03
						EN	.35
						IN	.35
						ES	.16

Table 4-6

MBTI Type Distribution for Program Participant Group

GROUP
TABULATED:
Participants

N= 35

MBTI TYPE TABLE
CENTER FOR APPLICATIONS
OF PSYCHOLOGICAL TYPE

LEGEND: % = PERCENT OF
TOTAL CHOOSING THIS GROUP
WHO FALL INTO THIS TYPE.
I = SELF-SELECTION INDEX;
RATIO OF PERCENT OF TYPE
IN GROUP TO % IN SAMPLE.

SENSING TYPES		INTUITIVE TYPES				N	%	I
WITH THINKING	WITH FEELING	WITH FEELING	WITH THINKING					
I S T J	I S F J	I N F J	I N T J	J U D G I N T R O V E R T S P E R C E P T I V E S E X T R A V E R T S J U D G I N G	E	15	42.86	.94
N= 5	N= 7	N= 1	N= 2		I	20	57.14	1.05
%=14.29	%=20.00	%= 2.86	%= 5.71		S	29	82.86	1.02
I= 1.62	I= .91	I= .65	I= 1.30		N	6	17.14	.90
I S T P	I S F P	I N F P	I N T P		T	14	40.00	1.13
N= 0	N= 3	N= 1	N= 1		F	21	60.00	.93
%= 0.00	%= 8.57	%= 2.86	%= 2.86		J	28	80.00	1.13
I= 0.00	I= 1.17	I= .65	I= 1.94		P	7	20.00	.68
E S T P	E S F P	E N F P	E N T P		IJ	15	42.86	1.08
N= 1	N= 1	N= 0	N= 0		IP	5	14.29	.97
%= 2.86	%= 2.86	%= 0.00	%= 0.00	J U D G I N G	EP	2	5.71	.39
I= .49	I= .39	I= 0.00	I= 0.00		EJ	13	37.14	1.20
E S T J	E S F J	E N F J	E N T J		ST	11	31.43	1.07
N= 5	N= 7	N= 1	N= 0		SF	18	51.43	1.00
%=14.29	%=20.00	%= 2.86	%= 0.00		NF	3	8.57	.65
I= 1.08	I= 1.36	I= .97	I= 0.00		NT	3	8.57	1.46
					SJ	24	68.57	1.17
					SP	5	14.29	.65
					NP	2	5.71	.78
					NJ	4	11.43	.97
				J U D G I N G	TJ	12	34.29	1.30
					TP	2	5.71	.65
					FP	5	14.29	.69
					FJ	16	45.71	1.04
					IN	5	14.29	.97
					EN	1	2.86	.65
					IS	15	42.86	1.08
					ES	14	40.00	.97

NOTE CONCERNING SYMBOLS FOLLOWING THE SELECTION RATIOS:

* IMPLIES SIGNIFICANCE AT THE .05 LEVEL, I.E., CHI SQ. > 3.8;

* IMPLIES SIGNIFICANCE AT THE .01 LEVEL, I.E., CHI SQ. > 6.6;

(UNDERScore) INDICATES FISHER'S EXACT PROBABILITY USED INSTEAD OF CHI-SQUARE.

BASE POPULATION USED IN CALCULATING SELECTION RATIO:

Total Guver Sample

BASE TOTAL N = 68. SAMPLE AND BASE ARE DEPENDENT.

*** CALCULATED VALUES OF CHI SQUARE OR FISHER'S EXACT PROBABILITY ***

TYPE TABLE ORDER							
.20	.18	.61	1.00	E	.22	IJ	.30
				I	.22	IP	1.00
.49	1.00	.61	1.00	S	.18	EP	.04
				N	.18	EJ	1.32
.35	.19	.49	*****	ST	.14	TJ	2.26
1.00	.31	1.00	*****	TP	.70	SP	.42
				F	.70	NP	.30
				NT	.51	FP	.24
				J	3.08	FJ	.07
				P	3.08		

Table 4-7

MBTI Type Distribution for Nonparticipant Group

GROUP
TABULATED:
Non-Participants

N= 20

MBTI TYPE TABLE
CENTER FOR APPLICATIONS
OF PSYCHOLOGICAL TYPE
LEGEND: % = PERCENT OF
TOTAL CHOOSING THIS GROUP
WHO FALL INTO THIS TYPE.
I = SELECTION INDEX;
RATIO OF PERCENT OF TYPE
IN GROUP TO % IN SAMPLE.

SENSING TYPES		INTUITIVE TYPES		J U D G I N G	I N T R O V E R T S	N	%	I
WITH THINKING	WITH FEELING	WITH FEELING	WITH THINKING					
I S T J	I S F J	I N F J	I N T J	P E R C E P T I V E S	E X T R A V E R T S	E	9 45.00	.99
N= 1	N= 6	N= 0	N= 1			I	11 55.00	1.01
%= 5.00	%=30.00	%= 0.00	%= 5.00			S	16 80.00	.99
I= .57	I= 1.36	I= 0.00	I= 1.13			N	4 20.00	1.05
I S T P	I S F P	I N F P	I N T P			T	6 30.00	.85
N= 1	N= 0	N= 2	N= 0			F	14 70.00	1.08
%= 5.00	%= 0.00	%=10.00	%= 0.00			J	12 60.00	.85
I= 3.40	I= 0.00	I= 2.27	I= 0.00			P	8 40.00	1.36
E S T P	E S F P	E N F P	E N T P			IJ	8 40.00	1.01
N= 1	N= 4	N= 0	N= 0			IP	3 15.00	1.02
%= 5.00	%=20.00	%= 0.00	%= 0.00			EP	5 25.00	1.70
I= .85	I= 2.72	I= 0.00	I= 0.00			EJ	4 20.00	.65
E S T J	E S F J	E N F J	E N T J			ST	5 25.00	.85
N= 2	N= 1	N= 1	N= 0			SF	11 55.00	1.07
%=10.00	%= 5.00	%= 5.00	%= 0.00			NF	3 15.00	1.13
I= .76	I= .34	I= 1.70	I= 0.00			NT	1 5.00	.85

NOTE CONCERNING SYMBOLS FOLLOWING THE SELECTION RATIOS:

* IMPLIES SIGNIFICANCE AT THE .05 LEVEL, I.E., CHI SQ. > 3.8;

* IMPLIES SIGNIFICANCE AT THE .01 LEVEL, I.E., CHI SQ. > 6.6;

* IMPLIES SIGNIFICANCE AT THE .001 LEVEL, I.E., CHI SQ. > 10.8.

(UNDERSCORE) INDICATES FISHER'S EXACT PROBABILITY USED INSTEAD OF CHI-SQUARE.

BASE POPULATION USED IN CALCULATING SELECTION RATIO:

Total Guyer Sample

BASE TOTAL N = 68. SAMPLE AND BASE ARE DEPENDENT.

*** CALCULATED VALUES OF CHI SQUARE OR FISHER'S EXACT PROBABILITY ***

TYPE TABLE ORDER							
.66	1.04	.55	1.00	E	.00	IJ	1.00
				I	.00	IP	1.00
.29	.31	.20	1.00	S	1.00	EP	.14
				N	1.00	EJ	.26
1.00	.02	1.00	*****	T	.35	ST	.77
				F	.35	SF	.14
.72	.26	1.00	*****	J	1.53	NF	1.00
				P	1.53	NT	1.00
						TJ	.55
						TP	1.00
						FP	1.54
						FJ	.19
						ES	.02

Hypothesis Three

The third hypothesis was that mean self-esteem score would be highest in the maintainer group, followed by the program participant group, and then the nonparticipant group. Using total self-esteem score as the dependent variable, orthogonal planned comparisons were made. The results are found in Table 4-8. No significant differences among the means of the three groups for total self-esteem score were located.

Hypothesis Four

For hypothesis four, it was predicted that the maintainer group would have the strongest relationship between extraversion and self-esteem, followed by the other groups. Results of the point biserial correlation are found in Table 4-9. As expected, the maintainer group had the highest r .

Hypothesis Five

Hypothesis five involved the use of orthogonal planned comparisons to locate differences among the groups based on the mean strength of preference for Thinking (T) or Feeling (F) as measured by the MBTI. It was expected that preference strength would be highest in the maintainers, followed by the program participants, and then the nonparticipants. The results of testing this hypothesis failed to demonstrate significance.

Table 4-8

Descriptive Statistics of Each Group: Mean Self-Esteem Scores

Group	N	Mean	Standard Deviation
Maintainers	13	75.38	27.74
Program Participants	32	68.50	17.23
Nonparticipants	20	66.20	18.10

Table 4-9

Relationship Between Extraversion and Self-Esteem for Maintainers,
Program Participants, and Nonparticipants

	r	r ²
Maintainers	0.61	0.37
Program Participants	0.30	0.09
Nonparticipants	0.45	0.21

Hypothesis Six

Hypothesis six was tested with a post hoc analysis that used a regression model to predict those variables associated with successful weight maintenance. The variables entered into the equation were age of obesity onset, amount of social support, weekly exercise frequency, parental weight status, total self-esteem score from the SEI, and Extraversion score from the MBTI. A summary of these data is found in Table 4-10. Using group membership as the dependent variable, it was found that weekly exercise frequency, parental weight history, social support, total self-esteem score, and Extraversion were predictive ($p < .05$) of group membership. The results showed a multiple $R^2 = .33$ for a linear composite of all but age of obesity onset. The results have been summarized in Table 4-11.

Table 4-10

Group Means Standard Deviations for Variables Entered

Variable	Maintainers	Program Participants	Nonparticipants
Age Obesity Onset	19.31 ± 15.84	24.82 ± 24.82	16.74 ± 13.79
Exercise Frequency	2.69 ± 1.93	4.21 ± 2.08	0.79 ± 1.32
Parental Weight	1.23 ± .44	0.70 ± .64	0.79 ± .63
Social Support	6.92 ± 6.44	6.29 ± 7.67	1.37 ± 1.12
Self-Esteem	75.38 ± 27.74	68.50 ± 17.23	66.20 ± 18.10
Extraversion	3.79 ± 23.97	-2.03 ± 28.15	4.30 ± 21.82

Table 4-11

Variables Predicting Group Membership

Variable	Step	R ²	Increase R ²	F (df)	F for Increase
Exercise Frequency	1	.13	.13	9.10 (1,60)*	
Parental Weight History	2	.20	.07	7.60 (2,59)*	5.16 (1,59)*
Social Support	3	.25	.05	6.54 (3,58)*	3.87 (2,58)*
Self-Esteem	4	.29	.04	5.94 (4,57)*	3.21 (3,57)*
Extraversion	5	.33	.04	5.49 (5,56)*	3.34 (4,45)*

*p < .05

CHAPTER V SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary and Conclusions

The purpose of this research was to identify psychological type, self-esteem, and weight history variables implicated in the successful maintenance of weight loss. These variables were studied for differences among the obese and previously obese. This research was also concerned with the relationship among psychological type, self-esteem, and weight history variables in predicting successful weight maintenance.

Participants completed the Myers-Briggs Type Indicator (MBTI) to identify psychological type, the Coopersmith Self-Esteem Inventory (SEI) to estimate self-esteem, and the Personal Weight History Questionnaire. Data from these instruments were tabulated for each group studied.

Data analysis revealed that participants varied according to age, sex, level of education, marital status, current occupation, and living environment. Of the 68 participants, 13 were maintainers who had been obese, lost weight, and maintained ideal weight for a minimum of one year. The obese group was subdivided into program participants and nonparticipants. Program participants were obese individuals who, at the time of this study, were involved with efforts to lose weight.

Nonparticipants were obese individuals who were not involved with weight loss efforts at the time of this study.

The demographic data about the participants showed that the three groups were similar in ratios of males and females and age distribution. Observable differences were noted among the groups for levels of education and marital status. The sampling method used in the research may account for these differences since results of the literature review did not lead to a prediction of differences in weight status based on sex, age, education, or marital status. Differences in education among the groups may also have been due to the sampling method used by the researchers. Nine of the 20 subjects in the nonparticipant category were recruited from Williston Memorial Hospital which is in a small rural town 15 miles southwest of Gainesville. Of those recruits, 7 were employees of hospital departments (e.g., the dietary department) whose positions did not require much formal education.

Expectations for the first two hypotheses were derived from the literature review of psychological type and learning style. The best data would have been obtained under true experimental conditions where participants' type, self-esteem, and relevant weight history variables were identified. Following identification, subjects would then be placed into individualized programs based on type and followed for at least one year after goal weight was achieved. For this research,

data were gathered ex post facto due to time and facility limitations. Therefore, causality may not be inferred.

Based on data analyzed for hypotheses one and two, the modal type of this study was identified as Introverted-Sensing-Thinking-Judging (ISFJ), representing 22% the total. The sample was found to be heterogeneous with respect to psychological type but with significantly more members indicating a preference for ISFJ than would be expected.

An individual comparison of the maintainer, program participant, and nonparticipant groups with the entire study sample showed that 20% of the nonparticipant group was Extraverted-Sensing-Feeling-Perceptive (ESFP). No other psychological type was significantly ($p < .05$) over- or under-represented in the other groups. The small sample size of the groups, especially the maintainers, may explain why there were no significant differences among the groups. Also, in securing the sample the researcher used intact groups that may have contained individuals who were congregated according to psychological type similarities.

There were no differences among the groups based on planned comparisons of the mean scores for self-esteem (hypothesis three). However, the percent of maintainers with high self-esteem scores was much larger than for the other two groups while scores indicating low self-esteem were found in approximately the same percent of subjects within each group. Again, data from a larger group would have increased the power of this test and may have produced significant results.

When interpreting the results of the self-esteem scores, one must recognize that other variables may have influenced these scores. Since these data were gathered while measuring maintenance of weight loss, successful individuals may have had artificially inflated scores. Rather than measuring a general concept of self, these scores may instead reflect the participants' concept of weight loss success. Finally, since the researcher was acquainted with some of the participants, this relationship may have affected the outcome of some self-esteem scores.

As postulated by hypothesis four, the maintainer group showed a stronger relationship between self-esteem and Extraversion than the other two groups. A larger sample may have increased the strength of the relationship for the maintainer group and may have led to more significant differences among the other groups.

Results from testing hypothesis five did not demonstrate group differences based on the mean strength of the Thinking-Feeling (TF) preference. The small number of participants, especially in the maintainer group, could have affected the outcome of this analysis. Another consideration is that the strength of the TF preference was found in other research to predict those who will successfully lose weight. For this reason, these data may not be predictive of those who will maintain that weight loss.

From the regression analysis model used in hypothesis six, it was found that exercise frequency, parental weight history, amount of social support, total self-esteem score, and preference for extraversion could be used to predict group membership while age of obesity onset could not. These results were consistent with the literature review. While the multiple R for the linear composite of these variables was .33, these data lead to the suggestion that within the sphere of weight control there are variables that may be manipulated to effect a greater likelihood of successful weight maintenance.

Recommendations

Those who do research in psychological type have indicated that the obese are a heterogeneous group, not differing substantially in type distribution from the general population. However, in this study ISFJ types were represented in a greater proportion than expected in the average U.S. population. For this reason, there is a need for health educators to recognize a need for greater individualization of information presented for learning and lifestyle changes. Sixteen different combinations of preferences are identified in the theory of psychological types. As indicated by Stronck (1980) and Wang (1980), individualizing instruction according to type characteristics not only affects student learning, but it also allows students to maximize their learning potential. Specifically, with regard to learning

differences and psychological type, Barger and Hoover (1983) found that psychological type affected student learning. Lawrence (1984) wrote that differential learning preferences existed for students based on psychological type and that differences in cognitive style were found in the Judging-Perceiving preference. Since many valid psychological instruments have demonstrated correlations between individual measures and preferences on the MBTI, one might expect that preferences other than Judging-Perceiving would influence student learning.

Since self-esteem affects self-perception, intellectual, and motivational processes (Coopersmith, 1986), an estimation of this psychological construct would give health educators information that would allow greater individualization of instruction for the obese. The benefit of enhanced student learning due to individualization of instruction has been described by Wang (1980) and Stronck (1980). Enhanced learning by the obese may increase the ability to lose weight and then maintain that loss.

Kawash (1982) described self-esteem as a central component of personality and Fish and Karabenick (1971) and Ryckman and Cannon (1975) found that positive self-esteem demonstrated by a relationship with internal locus of control as measured by Rotter's I-E Scale. This indicates that those with positive self-esteem believe that they are responsible for the consequences of their behavior. In a weight control program, early identification of low self-esteem could be

followed by remediation with trained professionals to build a more positive self-image in targeted individuals. The goal would be to both enhance learning potential and increase awareness of responsibility and consequences of behavior in the obese.

The weight history variables that were found to predict membership in the maintainer group included weekly exercise frequency of 2.69 days per week. A family history of one obese parent was also found for this group. Thus, one may conclude that while a family history of obesity may be implicated in the development of the disease, the control of other more manipulable variables may help both weight loss and maintenance. Another variable predicting group membership for the maintainers was social support. Participants in the maintainer group identified seven individuals who encouraged their weight loss. A high total self-esteem score was found to be characteristic of this group in addition to a preference for Extraversion. All of these findings were consistent with conclusions drawn from the literature review.

With regard to weight history variables, program planning should include an exercise component to promote weight loss and maintenance. Although parental weight history has been found to predict group membership, it is a variable that does not exclude individuals from maintenance of a weight loss. The genetics between parent and child cannot be changed, but one may change learned eating habits.

Therefore, weight control programs should help participants identify inappropriate eating behaviors and establish new ones. The importance of social support for both weight loss and maintenance has been summarized by the literature and the obese should be encouraged to enlist the support of others, beginning with those at home. The importance of building more positive self-esteem has been described with regard to weight control. Finally, the psychological construct of extraversion has been related to sense of well-being on the California Psychological Inventory and Kawash (1982) found a relationship between self-esteem and extraversion. It would be expected that as higher self-esteem was established in targeted individuals, extraversion would also be affected.

After studying the literature about weight control, a likely concern of practitioners is, "How do I individualize instruction based on psychological type, self-esteem, and weight history?" Using the modal ISFJ type from this research as an example, and following brief descriptions of the type characterizations from the Myers and McCaulley (1985) research, appropriate activities that could be planned are described.

Introverts are defined as introspective, private people, careful with details who sometimes have trouble communicating. Sensing individuals dislike new problems and situations. They prefer routine and work realistically toward a goal. They are patient with details

but dislike complicated problems. They typically solve problems in a step by step manner and are led by fact rather than inspiration. Feeling individuals look for harmony in relationships with others. Often, decisions may be influenced by the opinions of others. They enjoy pleasing others and need occasional praise. Judging individuals work according to a plan. They need to have decisions made and conclusions reached, although they sometimes judge too hastily without adequate information. Typically, they stay with one project until it is completed.

With these definitions in mind, group discussions would not be the most effective way to instruct ISFJ individuals. Rather, individual assignments that could be taken home, thought over, and then brought back for discussion would be best. If support groups were part of a weight loss program, introverts would be most comfortable with smaller groups where they could contribute to the group after having adequate time introspectively to formulate an answer. Their Sensing preferences would be most comfortable with programs that both emphasized achievement of incremental weight loss or behavioral goals and that encouraged working toward success in a systematic, simple, and organized manner. Learning activities that used a setting similar to the lifestyle and daily routine of the client would be most effective. Since Feeling preferences are satisfied with harmonious interpersonal relationships, appropriate

learning activities would focus on the relationship between eating behavior and personal relationships. As Judging individuals work best with planned goals and activities and decision-making, the most effective learning activities would emphasize structure, organization, and making appropriate food choices.

The involvement of other professionals is critical in program planning. Psychologists should be included to help remediate low self-esteem and to provide counseling in areas of need. Additionally, program planning should be comprehensive to include the expertise of physiologists to individualize the exercise component of each participant.

This research has implications for researchers in addition to practitioners. Indications for future research would be twofold. First, the study of a larger maintainer group would add statistical power to the results of this research and a larger study group would give more reliable statistics. Since most obesity researchers have only studied differences between obese and normal weight individuals in the search for predictors of weight maintenance, further exploration of differences between the obese and formerly obese may provide more meaningful information. Second, since a relationship between psychological type and optimized learning has been

demonstrated by researchers cited in the literature review, true experimental research using psychological type, self-esteem, and weight history as a basis for client screening and instruction would be the next step. Third, since no "magic bullet" has been found to solve the national problem of obesity, one may assume that perhaps no single cure exists and that obesity is a multidimensional problem. Therefore, additional research of the role in weight maintenance played by psychological type, self-esteem, and personal weight history variables may be warranted.

APPENDIX A
PERSONAL WEIGHT HISTORY QUESTIONNAIRE

Directions: Please print your responses to the following questions.

Name _____ Age _____ Sex _____

Height _____ (with one inch heels)

Weight _____ (clothed and with shoes)

Marital Status _____ Current Occupation _____

Highest Level of Education Completed _____

Who is supporting your weight loss effort?

me, alone _____ spouse _____ children _____ (how many?)

friend(s) _____ (how many?) co-workers _____ (how many?)

parent(s) _____ others _____ (who?)

How many days do you exercise weekly? _____

What type of exercise do you usually do? _____

What is the average length of time that you exercise? _____

Is one parent overweight? _____ Both? _____

At what age did you begin to gain weight? _____

Are you presently overweight? _____

Dieting history: please list weight reduction methods used and approximate dates.

What situations trigger eating in you?

negative emotions _____ social situations _____

positive emotions _____ obsession with food _____

other (please explain) _____

If you are at or near your goal weight, please complete the following:

- a. How long have you been at or near your goal?
- b. What weight reduction method/program most helped you reach and keep your goal weight?
- c. Why was it successful?

APPENDIX B
LETTER TO PARTICIPANTS

Dear Participant,

Thank you for volunteering to participate in my study of weight control. As you probably know, weight reduction and maintenance can be a tedious and frustrating experience. Don't you wish someone would find a way to explain why some people are successful with weight control while others are not?

This research is designed to explore possible answers to that question. All participants are people who, like you, are overweight or who have been overweight.

Information will be gathered by three survey instruments. Completion of the questions will take about one hour of your time. Your honest answers to these questions will not only provide me with information about successful weight control, but will also give you some insight into the nature of your personality. There are no right or wrong answers, just those that are true for you, since all people differ in their preferences and experiences.

You will have one week to complete the survey instruments, however, you may complete the material sooner and return it. All materials will be collected by those who gave them to you. The

information gathered will be kept strictly confidential and no one will know how you responded to the questions. Your results will be available within 4-6 weeks. Thank you for your assistance with this research.

APPENDIX C
PROCEDURES FOR COMPLETING THE SURVEY INSTRUMENTS

(Please use a #2 pencil or softer.)

1. Set aside about one hour of time to complete all three survey instruments. Find time that will not be interrupted or contain interruptions.
2. Relax. There are no "right" or "wrong" answers to these questions. Answer each as honestly as possible to ensure that your results will be meaningful to you.
3. Make sure your name is on each survey instrument.
4. Directions for the Myers-Briggs Type Indicator are on the cover of the question booklet. Please read them carefully.
5. The Coopersmith Inventory has a brief paragraph of instructions to read.
6. The Personal Weight History Questionnaire asks for historical information about your weight.
7. No one will see your responses to the questions. All information will be coded when entered into the computer.
8. When your survey instruments have been completed, please put them back into the brown envelope that has been provided. Make sure the Myers-Briggs booklet is also enclosed. You will have until _____ to return this information. Thank you.

REFERENCES

- Balch, P., & Ross, A. W. (1975). Predicting success in weight reduction as a function of locus of control: A unidimensional and multidimensional approach. Journal of Consulting and Clinical Psychology, 43, 119.
- Bargar, R., & Hoover, R. (1983). Psychological type and the matching of cognitive styles. Theory Into Practice, 23, 56-63.
- Bellack, A. S., Schwartz, J., & Rozensky, R. H. (1974). The contribution of external control to self-control in a weight reduction program. Journal of Behavior Therapy and Experimental Psychiatry, 5, 245-249.
- Bellack, A. S., & Tillman, W. (1974). Effects of task and experimenter feedback on the self-reinforcement behavior of internals and externals. Journal of Consulting and Clinical Psychology, 42, 330-336.
- Bengston, J. K. (1979). Cognitive style: The individual difference variable that doesn't make a difference. Viewpoints in Teaching and Learning, 55, 91-97.
- Bjorvell, H., Edman, G., Rossner, S., & Schalling, D. (1985). Personality traits in a group of severely obese patients: A study of patients in two self-chosen weight reducing programs. International Journal of Obesity, 9, 257-266.
- Blanchard, F. A., & Frost, R. O. (1983). Two factors of restraint: Concern for dieting and weight fluctuation. Behavior Research and Therapy, 21, 259-267.
- Bolocofsky, D. N., Coulthard-Morris, L., & Spinler, D. (1984). Prediction of successful weight management from personality and demographic data. Psychological Reports, 55, 795-802.
- Briggs, D. D. (1970). Your child's self-esteem. Garden City, NY: Doubleday.

- Brody, J. (1982). Jane Brody's nutrition book. New York: W. W. Norton.
- Brownell, K. D. (1980). Behavioral treatments for obesity. Dietetic Currents, 7, 13-18.
- Brownell, K. D. (1984). Behavioral, psychological, and environmental predictors of obesity and success at weight reduction. International Journal of Obesity, 8, 543-550.
- Bruch, H. (1961). Transformation of oral impulses in eating disorders: A conceptual approach. Psychiatric Quarterly, 35, 458-481.
- Burton, B. T., & Foster, W. R. (1985). Health implications of obesity: An NIH Consensus Development Conference. Journal of the American Dietetic Association, 85, 1117-1121.
- Burton, B. T., Foster, W. R., Hirsch, J., & VanItallie, T. B. (1985). Health implications of obesity: An NIH Consensus Development Conference. International Journal of Obesity, 9, 155-169.
- Caggiula, A. W., & Milas, N. C. (1986). Nutrition counseling for success. Topics in Clinical Nutrition, 1, 7-13.
- Carroll, L. J., Yates, B. T., & Gray, J. J. (1980). Predicting obesity reduction in behavioral and nonbehavioral therapy from client characteristics: The self-evaluation measure. Behavior Therapy, 11, 189-197.
- Chrzanowski, G. (1981). The genesis and nature of self-esteem. American Journal of Psychotherapy, 35, 38-46.
- Clayson, D. E., & Frost, T. F. (1984). Impact of stress and locus of control on the concept of self. Psychological Reports, 55, 919-926.
- Cooke, C. J., & Meyers, A. (1980). The role of predictor variables in the behavioral treatment of obesity. Behavioral Assessment, 2, 59-69.
- Coopersmith, S. (1986). SEI: Self-Esteem Inventories. Palo Alto, CA: Consulting Psychologists Press.

- Danish, S. J., Lang, D., Smicklas-Wright, H., & Laquatra, I. (1986). Nutrition counseling skills: Continuing education for the dietitian. Topics in Clinical Nutrition, 1, 25-32.
- DeYoub, P. (1978). Relation of suggestibility to obesity. Psychological Reports, 43, 175-180.
- Dixon, P. N., & Elias, S. F. (1979). Response preference within the Rotter I-E scale: Perceived locus of control of self, average, and ideal others. Perceptual and Motor Skills, 49, 631-634.
- Drewnowski, A., Risky, D., & Desor, J. A. (1982). Feeling fat yet unconcerned: Self-reported overweight and the restraint scale. Appetite, 3, 273-279.
- Fantini, M. D. (1980). A contemporary approach to individualization. Theory Into Practice, 19, 28-31.
- Fish, B., & Karabenick, S. A. (1971). Relationship between self-esteem and locus of control. Psychological Reports, 29, 784.
- Friedman, M. I., & Strickler, E. M. (1976). The physiological psychology of hunger: A physiological perspective. Psychological Review, 83, 409-427.
- Gardner, R. M., Brake, S. J., Reyes, B., & Maestas, D. (1983). Sensory and nonsensory factors and the concept of externality in obese subjects. Perceptual and Motor Skills, 57, 247-254.
- Garn, S. M., & Clark, D. C. (1976). Trends in fatness and the origins of obesity. Pediatrics, 57, 433-456.
- Garrow, J. S. (1979). Weight penalties. British Medical Journal, 10, 1171-1173.
- Good, T. L., & Brophy, J. E. (1987). Looking in classrooms (rev. ed.). New York: Harper and Row.
- Gormanous, G. K., & Lowe, W. C. (1975). Locus of control and obesity. Psychological Reports, 37, 30.
- Goss, R. J. (1966). Hypertrophy versus hyperplasia. Science, 153, 1516-1620.

- Grill, H. J., & Norgren, R. (1978). Chronically decerebrated rats demonstrate satiation but not bait shyness. Science, 201, 267-269.
- Hankins, N. E., & Hopkins, L. (1978). Locus of control and weight loss in joiners and non-joiners of weight reduction organizations. Psychological Reports, 43, 11-14.
- Harris, C. T. B. (1985). Psychological type and obesity (Doctoral dissertation, Georgia State University, 1985). Dissertation Abstracts International, 46, 2233A.
- Heppner, P. P., Hibbel, J., Neal, G. W., Weinstein, C. L., & Rabinowitz, F. E. (1982). Personal problem solving: A descriptive study of individual differences. Journal of Counseling Psychology, 29, 580-590.
- Herman, C. P., & Mack, D. (1975). Restrained and unrestrained eating. Journal of Personality, 43, 647-660.
- Herman, C. P., Olmsted, M. P., & Polivy, J. (1983). Obesity, externality, and susceptibility to social influence: An integrated analysis. Journal of Personality and Social Psychology, 45, 926-934.
- Herman, C. P., & Polivy, J. (1975). Anxiety, restraint, and eating behavior. Journal of Abnormal Psychology, 84, 666-672.
- Herman, C. P., Polivy, J., Pliner, P., Threlkeld, J., & Munic, D. (1978). Distractibility in dieters and nondieters: An alternative view of "externality." Journal of Personality and Social Psychology, 36, 536-548.
- Hibbscher, J. A., & Herman, C. P. (1977). Obesity, dieting, and the expression of "obese" characteristics. Journal of Comparative and Physiological Psychology, 91, 374-380.
- Hildebrandt, S. E. (1982). Some differences in cognitive style between successful and unsuccessful weight loss maintainers. (Doctoral dissertation, U.S. International University, 1982). Dissertation Abstracts International, 43, 525B.
- Hirsch, J., & Knittle, J. L. (1970). Cellularity of obese and nonobese human adipose tissue. Federation Proceedings, 29, 1516-1521.

- Hirsch, J., Knittle, J. L., & Salans, L. B. (1966). Cell lipid content and cell number of obese and nonobese human adipose tissue. Journal of Clinical Investigation, 45, 1023.
- Hoeltzel, K. E. (1986). Counseling methods for dietitians. Topics in Clinical Nutrition, 1, 33-42.
- Hoiberg, A., Berard, S. P., & Watten, R. H. (1980). Correlates of obesity. Journal of Clinical Psychology, 36, 983-991.
- Isaac, S. (1975, October). Personality types, learning styles, and teaching strategies: From learning theory and research to educational practice. Paper presented at the First National Conference on the Uses of the Myers-Briggs Type Indicator, Gainesville, FL.
- Jacobs, S. B., & Wagner, M. K. (1984). Obese and nonobese individuals: Behavioral and personality characteristics. Addictive Behaviors, 9, 223-226.
- Johnson, W. G., Lake, L., & Mahan, J. M. (1983). Restrained eating: Measuring an elusive construct. Addictive Behaviors, 8, 413-418.
- Jung, C. G. (1971). Psychological types (Vol. 6). H. G. Baines (Trans.) Revised by R. F. C. Hull. Princeton, NJ: Princeton University Press. (Original work published in 1921)
- Kaplan, H. I., & Kaplan, H. S. (1957). The psychosomatic concept of obesity. Journal of Nervous and Mental Diseases, 125, 181-201.
- Kawash, G. F. (1982). A structural analysis of self-esteem from preadolescence through young adulthood: Anxiety and extraversion as agents in the development of self-esteem. Journal of Clinical Psychology, 38, 301-311.
- Kincey, J. (1980). Target setting, self-reinforcement pattern and locus of control orientation as predictors of outcome in a behavioral weight loss programme. Behavior Research and Therapy, 18, 139-145.
- Kincey, J. (1981). Internal-external control and weight loss in the obese: Predictive and discriminant validity and some possible clinical implications. Journal of Clinical Psychology, 37, 100-103.
- Kingsley, R. G., & Wilson, G. T. (1977). Behavior therapy for obesity: A comparative investigation of long-term efficacy. Journal of Consulting and Clinical Psychology, 45, 288-298.

- Lawrence, G. L. (1984). Learning style as a facet of personality: A review of research involving the MBTI. Paper presented at the 1984 Annual Meeting of the American Educational Research Association, New Orleans, LA.
- Livingston, G. B. (1971). A correlational analysis of modes of perception and judgment and measures of self-concept. Dissertation Abstracts International, 32, 182A.
- Lowe, M. R. (1984). Dietary concern, weight fluctuation and weight status: Further explorations of the restraint scale. Behavior Research and Therapy, 22, 243-248.
- Lowe, M. R., & Fisher, E. B. (1983). Emotional reactivity, emotional eating, and obesity: A naturalistic study. Journal of Behavioral Medicine, 6, 135-149.
- McKenna, R. J. (1972). Some effects of anxiety level and food cues on the eating behavior of obese and normal subjects. Journal of Personality and Social Psychology, 22, 311-319.
- Mendelson, B. K., & White, D. R. (1982). Relation between body-esteem and self-esteem of obese and normal children. Perceptual and Motor Skills, 54, 899-905.
- Metropolitan Life Insurance Company. (1959). New weight standards for men and women. Statistical Bulletin, 40, 1-4.
- Metropolitan Life Insurance Company. (1983). 1983 Metropolitan height and weight tables. Statistical Bulletin, 54, 3-9.
- Miller, P. M., & Sims, K. L. (1981). Evaluation and component analysis of a comprehensive weight control program. International Journal of Obesity, 5, 57-65.
- Montegriffo, V. M. E. (1968). Height and weight of a United Kingdom adult population with a review of anthropometric literature. Annals of Human Genetics, 31, 389-394.
- ✓ Myers, I. B., & McCaulley, M. H. (1985). A guide to the development and use of the Myers-Briggs Type Indicator. Palo Alto, CA: Consulting Psychology Press.
- Nisbett, R. E. (1972). Hunger, obesity, and the ventromedial hypothalamus. Psychological Review, 79, 433-453.
- Owusu-Bempah, J., & Howitt, D. L. (1983). Self-modelling and weight control. British Journal of Medical Psychology, 56, 157-165.

- Pearlson, G. D., Flournoy, L. H., Simonson, M., & Slavney, P. R. (1981). Body image in obese adults. Psychological Medicine, 11, 147-154.
- Peterson, C., & Austin, J. T. (1985). Review of Coopersmith Self-Esteem Inventories. In J. V. Mitchell, Jr. (Ed.), Mental measurement yearbook (pp. 396-397). Lincoln, NB: University of Nebraska.
- Polivy, J. (1976). Perception of calories and regulation of intake in restrained and unrestrained subjects. Addictive Behaviors, 1, 237-243.
- Polivy, J., Herman, C. P., & Warsh, S. (1978). Internal and external components of emotionality in restrained and unrestrained eaters. Journal of Abnormal Psychology, 87, 497-504.
- Pomerantz, A. S., Greenberg, I., & Blackburn, G. L. (1977). MMPI profiles of obese men and women. Psychological Reports, 41, 731-734.
- Rodin, J. (1981). Current status of the internal-external hypothesis for obesity. American Psychologist, 36, 361-372.
- Rodin, J., Slochower, J., & Fleming, B. (1977). Effects of degree of obesity, age of onset, and weight loss on responsiveness to sensory and external stimuli. Journal of Comparative and Physiological Psychology, 91, 586-597.
- Rosenthal, B., & Marx, R. D. (1978). Differences in eating patterns of successful and unsuccessful dieters, untreated overweight and normal weight individuals. Addictive Behaviors, 3, 129-134.
- Rosenthal, B., & Marx, R. D. (1979). Modeling influences on the eating behavior of successful and unsuccessful dieters and untreated normal weight individuals. Addictive Behaviors, 4, 215-221.
- Ross, S. M., Rakow, E. A., & Bush, A. J. (1980). Instructional adaptation for self-managed learning systems. Journal of Educational Psychology, 72, 312-320.
- Rotter, J. (1966). Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 80 (1, Whole No. 609).

- Rotter, J. (1975). Some problems and misconceptions related to the construct of internal versus external control of reinforcement. Journal of Consulting and Clinical Psychology, 43, 56-67.
- Rozensky, R. H., & Bellack, A. S. (1976). Individual differences in self-reinforcement style and performance in self- and therapist-controlled weight reduction programs. Behavior Research and Therapy, 14, 357-364.
- Ruderman, A. J., & Christensen, H. (1983). Restraint theory and its applicability to overweight individuals. Journal of Abnormal Psychology, 92, 210-215.
- Ruderman, A. J., & Wilson, G. T. (1979). Weight, restraint, cognitions, and counterregulation. Behavior Research and Therapy, 17, 581-590.
- Ryckman, R. M., & Cannon, D. W. (1975). Multidimensionality of locus of control and self-esteem. Psychological Reports, 37, 786.
- Saracho, O. N. (1980). The relationship between the teachers' cognitive style and their perceptions of their students' academic achievement. Educational Research Quarterly, 5, 40-50.
- Saracho, O. N., and Spodek, B. (1981). Teacher's cognitive styles: Educational implications. The Educational Forum, 45, 153-159.
- Sawchenko, P. E., & Friedman, M. I. (1979). Sensory functions in the liver--a review. American Journal of Physiology, 236, R5-R20.
- Schachter, S. (1971). Some extraordinary facts about obese humans and rats. American Psychologist, 26, 129-144.
- Schachter, S., Goldman, R., & Gordon, A. (1968). Effects of fear, food deprivation and obesity on eating. Journal of Personality and Social Psychology, 10, 91-97.
- Schallow, J. (1975). Locus of control and success at self-modification. Behavior Therapy, 6, 667-671.
- Schultz, D. (1981). Theories of personality. Belmont, CA: Wadsworth.
- Schulz, L. O. (1986). Obese, overweight, desirable, ideal: Where to draw the line in 1986? Journal of the American Dietetic Association, 86, 1702-1704.

- Sewell, T. E. (1985). Review of Coopersmith Self-Esteem Inventories. In J. V. Mitchell, Jr. (Ed.), Mental measurements yearbook (pp. 397-398). Lincoln, NE: University of Nebraska.
- Slochower, J. (1976). Emotional labeling and overeating in obese and normal weight individuals. Psychosomatic Medicine, 38, 131-139.
- Spencer, J. A., & Fremouw, W. J. (1979). Binge eating as a function of restraint and weight classification. Journal of Abnormal Psychology, 88, 262-267.
- Stronck, D. R. (1980). The educational implications of human individuality. The American Biology Teacher, 42, 146-151.
- Stunkard, A. J., & McLaren-Hume, M. (1959). The results of treatment for obesity. Archives of Internal Medicine, 104, 79-85.
- Thomason, J. A. (1983). Multidimensional assessment of locus of control and obesity. Psychological Reports, 53, 1083-1086.
- Tobias, L. L., & MacDonald, M. L. (1977). Internal locus of control and weight loss: An insufficient condition. Journal of Consulting and Clinical Psychology, 45, 647-653.
- Vasseli, J. R., Cleary, M. P., & VanItallie, T. B. (1984). Modern concepts of obesity. Nutrition Reviews, 41, 361-370.
- Wang, M. C. (1980). Adaptive instruction: Building on diversity. Theory Into Practice, 19, 122-128.
- Weiss, A. R. (1977). Characteristics of successful weight reducers: A brief review of predictor variables. Addictive Behaviors, 2, 193-201.
- Wooley, S. C. (1972). Physiologic versus cognitive factors in short term food regulation in the obese and nonobese. Psychosomatic Medicine, 34, 62-68.

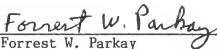
BIOGRAPHICAL SKETCH

Laura Kreis Guyer was born on June 5, 1955, in Fort Riley, Kansas, daughter of Donald E. and Patricia S. Kreis. The Kreis family eventually settled in Sarasota, Florida, where she graduated early from Riverview High School in 1972. She received an Associate of Arts degree from Manatee Community College in 1974. A bachelor's degree in food science and human nutrition was earned at the University of Florida in 1977. A Master of Education degree was received from the same institution in 1981. She is currently a consulting dietitian to Williston Memorial Hospital in Williston, Florida, a mother and teacher of Benjamin and Matthew Guyer who are her future, and wife and help-mate to her husband, Robert.

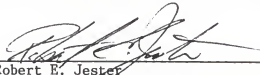
I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.


Gordon D. Lawrence, Chairman
Professor of Educational Leadership

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.


Forrest W. Parkay
Associate Professor of Educational Leadership

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

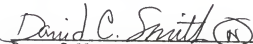

Robert E. Jester
Associate Professor of Foundations of Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.


Peggy L. Borum
Associate Professor of Food Science and Human Nutrition

This dissertation was submitted to the Graduate Faculty of the College of Education and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

December, 1987


David C. Smith
Dean, College of Education

Dean, Graduate School